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Elementary School Teachers' Integration Of Digital Literacy During Collaborative Planning Sessions In a Project-Based School

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ACCEPTANCE

This dissertation, ELEMENTARY SCHOOL TEACHERS' INTEGRATION OF DIGITAL LITERACY DURING COLLABORATIVE PLANNING SESSIONS IN A PROJECT-BASED SCHOOL, by ZEHRA OZTURK, was prepared under the direction of the candidate's Dissertation Advisory Committee. It is accepted by the committee members in partial fulfillment of the requirements for the degree, Doctor of Philosophy, in the College of Education and Human Development, Georgia State University.

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ELEMENTARY SCHOOL TEACHERS' INTEGRATION OF DIGITAL LITERACY DURING COLLABORATIVE PLANNING SESSIONS IN A PROJECT-BASED SCHOOL

by

ZEHRA OZTURK

Under the Direction of Mona Matthews

ABSTRACT

The notions of literacy and literacy instruction have changed in profound ways as new technology and the Internet become central to the use of information and the acquisition of knowledge (Lankshear & Knobel, 2003; Leu, Kinzer, Coiro & Cammack, 2004). The social, cultural and technological changes point out the importance of integrating new literacies into classrooms literacy instruction in order to prepare students for 21st century work, life and career opportunities (Ito et al., 2013; Leu & Kinzer, 2000). To support the development of digital literacy, a need exists to find effective ways to integrate technology within classroom instruction. Teachers play a central role in ensuring this need is met, particularly for students who attend school in low SES urban areas. This study addressed need by examining the complex situation of teachers' understanding of digital literacy integration as revealed during their collaborative planning sessions while they designed a project-based learning (PBL) unit. This qualitative study

used a case study design. Participants included third-grade teachers from an urban charter school that serves a low-income community. Data collection included observations of planning sessions, teacher interviews, researcher reflections and memos. Data were analyzed using constant comparative methods. This study indicated that the planning process was a dynamic, non-linear and an iterative process that required revisions and edits during the project planning and implementation period. Planning was a dynamic process created by multiple internal and external factors. This study illuminated the nature of the interactions of the teachers during planning meetings. Planning for the teachers was expressed in three different ways: collaborative, pair, and individual planning. This study revealed teachers demonstrated the shift in understanding of what it means to be literate in the 21st century. The third-grade team's insights about digital literacy encompassed developing 21st century skills, changing the definition of what means to be literate, becoming a digital citizen, creating relevance to students' lives, using technology for pleasure as well as teaching. The examination of the five teachers' collaborative interactions as they planned to use digital technology offers insights into how to assist other teachers in those efforts.

Keywords: Digital Literacy, Technology Integration, Teacher Planning, Collaboration, Project Based Learning and Literacy

ELEMENTARY SCHOOL TEACHERS' INTEGRATION OF DIGITAL LITERACY DURING COLLABORATIVE PLANNING SESSIONS IN A PROJECT-BASED SCHOOL

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DEDICATION

This work is dedicated to the village supporting me through the journey of life. To my husband, Ozgur Ozturk, it is to you that I am most grateful, as none of this work would have been possible without you. From late night classes to " I can't do this" cries, you have worked tirelessly in your support of my efforts. I truly don't know how I'll ever thank you enough for helping to make this dream come true. I have made it this far because of your love and support. To my children, Omer Bera and Ali Safa, for the nights when I closed the door and missed your kisses goodnights. Thank you for your gifts of laughter and hugs when I needed them the most. To my parents, Sevket and Selime Gunenc, for several oversea trips from all the way Turkey without hesitation, taking care of my family while I am "gone to dissertating". Your unconditional love, prayers were lights in this journey. To my brother, Mehmet Gunenc, who believed in me without hesitation and encouraged me through this transition. To my friends, Ummuhan, Gonca, two Zehras, Meral, Mercan, Nezahat, your prayers, support along this journey have not gone unnoticed. Our bond is something so special to me. I appreciate your check-ins, humor and much needed therapy during demanding times. I also dedicate this disseration to my many family members and friends offering support through love, humor, childcare and forgiveness in my failures. I love you with all my heart.

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Definition Of Terms

Community of Practice: "a set of relations among people, activity, and world, over time and in relation with other tangential and overlapping communities of practice" (Lave & Wenger, 1991, p. 98).

Digital Literacy: "the ability to understand and use information in multiple formats from a wide variety of sources when it is presented via computers" (Gilster, 2007, p. 1).

Literacy as Practice: "a set of socially organized practices, which makes use of symbol system and technology for producing and disseminating it," (Scribner & Cole, 1981, p. 236).

Project-Based Learning: "a teaching method in which students gain knowledge and skills by working for an extended period of time to investigate and respond to an authentic, engaging and complex question, problem, or challenge" (Buck Institute, 2016).

Situated Learning: "the notion of learning knowledge and skills in contexts that reflect the way knowledge will be useful in real-life" (Collins & Brown, 1988, p. 2).

Abbreviations

BIE—*Buck Institute for Education*

CCSS—*Common Core State Standards*

CCSSO—*Council of Chief State School Officers*

CoP— Community of Practice

ICS— *Integrated Computer Science*

ILA— *International Literacy Association*

LPP—Legitimate Peripheral Participation

NCTE—*National Council of Teachers of English*

NGA—*National Governors Association*

NLS—*New Literacy Studies*

NSDC—*National Skill Development Corporation*

PBL—*Project Based Learning*

TNTP—*The New Teacher Project*

SASS—*Schools and Staffing Survey*

1 INTRODUCTION AND STATEMENT OF THE PROBLEM

A sociocultural view of learning centers attention on cultural historical practices and views those practices as fundamental to understanding the nature of learning (Scribner & Cole, 1981). Through social interactions, human beings construct their beliefs, their ideas, and make their own interpretations with all influenced by their previous experiences. According to a sociocultural perspective, human action employs meditational means such as tools and language that shape the action in significant ways (Wertsch, 1991). In other words, this perspective of learning is highly relational and tied to a shared context, purpose, and activity with culturally defined tools mediating the interactions within those activities (Lave, 1988; Ito et, al. 2013; Rogoff, 2003).

For young children, becoming literate is one of the most important outcomes of their interactions within these shared contexts, because what counts as literacy within those contexts helps them understand how the world operates (Halliday, 2013). A sociocultural perspective expands the definition of literacy by attending to the myriad ways individuals make meaning within the flow of their social life and their participation in other kinds of purposeful activities. This expanded definition challenges the traditional view of literacy by arguing that reading and writing are neither neutral nor technical operations. Rather, literacy is shaped by one's values, attitudes, and personal relationships (Heath, 1983; Scribner & Cole, 1981; Street, 1993). Lankshear and Knobel (2011) account for these changes in their definition of literacy as the ways people generate, communicate, and negotiate meanings through mediated texts (p. 33).

Today, digital technology serves as an essential mediator of those texts. While the availability of digital technology increases the impact of participatory practices and increases the circulation of information, it is important to acknowledge that access to technology and its

resources, such as the Internet, are not equally distributed. Children who attend schools in low socioeconomic status (SES) areas are less likely than their White middle-class peers to have access to many types of technology (Gutnick et al. 2011). According to *The Search for Computer Science: Access and Barriers in U.S. K-12 Report* (2013), only four in ten students who attend schools in low SES communities reported using computers every day at school. While the percentage of students using technology increases at later grade levels, the disparities in access between racial and economic groups continues throughout their schooling with the disparities most notable within populations of African American children in low SES, urban areas. Students in these areas often lack the same opportunities to use technology within classroom settings as do their White middle-class peers. Moreover, inequality in technology access and use contributes to disparities in participatory digital practices. In other words, lack of access to technology leads to a participation gap (Jenkins et al., 2009) with specific groups of students having more opportunities to participate in these digital literacy practices than others.

Teachers play an essential role in achieving equality in the use and access of technology and closing the gap that exists between populations. To close this gap and to develop the skills required of digital participation, teacher support and guidance are essential (Gorski, 2009). Teachers can assist students to use technology in ways that promote their participatory learning (Kim & Lee, 2011). However, for teachers to provide such support and guidance, they need to know about 21st century literacies, and they need to know how to integrate technology into their curriculum. Unfortunately, many teachers do not possess the pedagogical and technological knowledge required to integrate technology into their classroom instruction (Hutchison & Reinking, 2011; Mishra & Koehler, 2006). However, evidence exists that when teachers are supported in their efforts to develop this knowledge, they can offer their students the needed

guidance and support (Tucker & Willis, 2011). That support can come in many forms such as professional development, the availability of technology resources, and administrative backing (Tucker & Willis, 2011). Because the existence of such support aims to influence teachers' integration of technology within their classroom instruction, investigating how teachers plan for that instruction offers one way to examine the influence of that support.

This study aimed to contribute to the understanding of how teachers, supported in their efforts to integrate technology within their instruction, plan that instruction. To that end, I investigated how one group of third grade elementary teachers who teach in an urban school with students from a low SES community planned to integrate technology within their planning sessions. I chose to study their planning sessions because planning is an important component of understanding how teachers apply various systems of knowledge when designing instruction for their students (Cho & Woodward, 2014). In addition, using qualitative methods allowed me to conduct an in-depth examination of the teachers' planning. Specifically, I used methods, observation, interviews, and field notes, which allowed me to examine the complex situation of teachers' understanding of digital literacy as revealed during their collaborative planning sessions while they designed their project-based learning (PBL) unit.

Purpose and Significance of the Study

Across time what constitutes literacy and effective literacy instruction have changed as a result of the types of tools individuals use as they participate in day-to-day activities and the ways those tools mediate interactions in these contexts (Leu, Kinzer, Coiro & Cammack, 2004). Hence, literacy evolves as a consequence of cultural, historical, and social changes. Today, in a world dominated by computers and technology, literacy goes beyond being able to read and write print. Furthermore, the social aspects of literacy shift the focus from individual expression

to participatory involvement (Jenkins, et al., 2006) expanding what counts as literacy (Gee, 1990). This broader reconceptualization of literacy fueled by the presence of digital technologies, includes participation and collaboration as central elements of knowledge construction. Within this broader conceptualization, digital literacies imply a critical approach to information access. This critical approach encompasses integrating, evaluating, analyzing, synthesizing digital sources, and constructing new knowledge (Lankshear & Knobel, 2007, 2011). As a result, social practices that engage these new technologies shift the focus away from a search and publish model towards a model of information circulation, which highlights the production, distribution, evaluation, reproduction, and communication of information (Lankshear &Knobel, 2011). This changing nature of literacy brought on by digital technologies emphasizes the need to consider reading and writing beyond technical operations. Notions of literacy and literacy instruction have changed in profound ways as these new digital technologies and the Internet become central to the dissemination of information and the acquisition of knowledge (Lankshear & Knobel, 2003; Leu, Kinzer, Coiro & Cammack, 2004).

Therefore, to understand digital literacy practices, one should highlight the complexity of participation, a central tenet of these practices. To understand what participation is, it is worth noting the difference between interaction and participation. Many literacy practices might be interactive but not necessarily participatory. Interaction occurs when objects and events mutually influence one another. In contrast, participation encompasses not only receiving information but also creating and synthesizing information (Welch & Dooley, 2013). This idea of participation is not a new concept in literacy research. Technology has expanded the participatory culture in many ways and enriched the experiences of social groups by creating digital spaces that offer more and new opportunities for participation. (Jenkins, Ito, & Boyd, 2015). Even though social

groups have always exhibited multiple versions of participation, today's technologies have made it easier to participate in longstanding practices, such as communicating with loved ones. Jenkins, Ito, and Boyd (2015) add "technologies are not participatory, cultures are" (p.11). In other words, participatory culture cannot be limited to a set of technological features. Instead, it represents an evolving concept that relates to existing practices and norms (Jenkins, Ito, & Boyd, 2015).

These digital participatory spaces created by this culture increase participation that enable equal collaboration. However, it is important to question whether everyone has the opportunity to participate at the same level. The opportunity gap between privileged and non-privileged groups cannot be ignored. Jenkins, Ito, and Boyd (2015) also argue that “we live in a more participatory culture, but we don’t live in a fully participatory culture” (p.180). Hence, while all people should possess agency and voice, because of the gap in physical access to technology and resources not everyone has the opportunity to use their agency and voice in wider platforms.

These social, cultural, and technological changes point out that for students who live in the 21st century to be successful in this technology-infused society, they need to be able to participate and communicate in a digital society across print, visual, and multiple media (NCTE, 2008). Schools need to emphasize the importance of integrating these new literacies into classrooms to prepare students for 21st century work, life, and career opportunities (Ito et al., 2013; Leu & Kinzer, 2000). Teachers, therefore, become central in orchestrating students' learning experiences when literacy instruction combines with technologies. However, according to Kim and Lee (2011), for students from low SES communities, teacher assistance seems to be not only central but critical. In their study, students developed an interest in the subject matter presented online and increased their academic standing. They stated that teachers’ assistance was

essential to closing the participation gap and to using technology in ways that promote learning. For this to occur, however, they asserted, teachers need support. For example, researchers such as Kim and Lee (2011) recommended that when that support is in the form of professional development it should attend to enhancing teachers' understanding of effective digital literacy practices that help them prepare and plan to integrate technology and promote participatory practices in their instruction. Other research (Leu, Kinzer, Coiro & Cammack, 2004) suggests that when professional development attends to these areas, teachers gain an understanding of how to use digital technology and build their digital skills. As a result, teachers create active student engagement and participatory learning opportunities.

Incorporating the use of digital technology into well-designed collaborative and project-based learning environments provides effective and enjoyable contexts in which students can learn and in which teachers want to teach. A project based-learning (PBL) model creates teaching spaces in which students gain knowledge and skills by working with their peers over an extended period of time investigating a complex real-world problem in authentic and engaging ways (Buck Institute, 2016). Furthermore, applying classroom knowledge to solve real-world problems promotes deep learning (Ito et al., 2013). In a similar vein, PBL provides opportunities for students to use technology in ways similar to those used outside of school, transferring their out-of-school knowledge to formal school environments. In a PBL model, students create, practice, and contribute literacy texts as part of a broader digital conversation. In addition, students working with their classmates and participating in these digital conversations provide opportunities to receive feedback and improve their ability to engage in digital conversations (Darling-Hammond, Zielezinski & Goldman, 2014). Thus, a PBL model stimulates collaborative learning, provides opportunities for students to make real-life connections to in-school learning,

and enables students to use digital technologies (Darling-Hammond, Zielezinski & Goldman, 2014). Which in turn helps students become competent contributors and participants in society and affects their future life opportunities (Ito et al., 2013). Today's students enter a job market that values the skills and ability to work in teams, to solve complex problems, and to apply what they know and can do from one context to another.

Relevant to this study are the technologies used to mediate learning within a PBL model. This study provides insights into how teachers who had received support in the form of professional development in implementing PBL and support in using technology plan instruction. Therefore, situating the study within this school offered a unique context to study how teachers planned to use technology in their instruction. One, the teachers in this study experienced support in their efforts to integrate technology. Two, the teachers the summer prior to my study received online PD in how to design instruction using a PBL framework. Three, the PBL framework included the teachers participating in collaborative planning, and four, the teachers worked in an urban school with a predominant low SES African American population.

Although studies exist that have investigated a PBL approach (Barron & Darling-Hammond, 2008) and the use of technology in low SES schools (The Search for Computer Science: Access and Barriers in U.S. K-12 Report, 2013) none of the studies located combined all of these. Therefore, this study adds to the current literature in several ways. First, this research documented how teachers supported in their efforts to integrate technology within their instruction, planned that instruction. Second, this study provides insight into how teachers who work in a school in a low SES area but with access to a rich technology learning environment, integrated technology within their instruction. Often, these schools have limited resources and access to technology, and lack effective teacher support. Third, this study occurred in a school

that recently had adopted an instructional model guided by principles of design thinking and project-based learning. Such environments offer multiple opportunities for students to use digital literacies as they work for extended periods of time investigating complex problems in authentic and engaging ways (Buck Institute, 2016). Fourth, the school partnered with two research universities. The proximity of the school to these two universities facilitated the establishment of a long-term partnership with both universities. That university partnership provided the teachers professional development in technology integration and computational thinking.

Research Questions

This study investigated the following research question:

1. How can elementary teachers planning be described?
2. How do elementary teachers interact in their planning sessions?
3. What understanding of digital literacy is implied in how the teachers integrate technology into their planning sessions?

Background for the Study

To answer the questions that guided this study, I present the view of digital literacies that informed my study. This information guided how I viewed teachers' integration of technology and digital literacies when planning their PBL project and how I examined the teachers' perceptions of digital literacies and new literacy practices.

Digital Literacy

In the 1990's and 2000's Gee (1990, 1996, 2007) originated the phrase *New Literacy Studies* (NLS) to refer to the interaction of old and new literacies. Influenced by a sociocultural perspective, NLS explains how social and cultural contexts shape literacies and thereby extend

the ways of thinking about literacy. Within this framework, time, place, people, and mediational tools all contribute to an individual's literacy development and practices (Street, 1993). As a consequence, NLS researchers extend the scope of literacy practices to include digital literacies**.**

The term digital literacy used by a number of scholars refers to an ability to read and understand hypertextual and multimedia texts (Bawden, 2001). Paul Gilster (1997) coined the term *digital literacy* in his book of the same title. In this book, Gilster (1997) defined digital literacy as "the ability to understand and use information in multiple formats gathered from a wide variety of sources and presented via computers" (p. 1). Gilster produced this definition as the Internet gained its initial popularity, so he focused on Internet applications. While some readers might assume that representations of digital literacies and the successful use of the Internet essentially are identical, Gilster explicitly stated that the Internet should be considered as one among many sources for ideas in a technology-rich society. Moreover, Gilster noted that he was not asking readers to give up other sources of information and only use the Internet. Rather, he emphasized that digital literacy encompasses understanding how to complement traditional print sources of text with digital technologies. Hague and Williamson (2009), agreed and stated that digital literacy shares similarities with conventional literacy as both involve being able to read and write in ways that represent the shared language of a cultural group. Digital literacy embodies new literacy practices mediated by new technologies (Lankshear & Knobel, 2006; Marsh, 2011) and acknowledge the multimodal, multimedia nature of communicative practices (Jewitt & Kress, 2010). Digital literacy also illustrates how technologies including video games, digital books, and the Internet change the ways we read, write and by consequence, influence how teachers teach literacy and what they teach (Leu, Kinzer, Coiro, & Cammack, 2004). For this study, digital literacy "refers to reading and writing of digital texts, for example being able to

read a website by navigating through hyperlinks and writing by uploading digital photos to a social networking site" (Hague & Williamson, 2009, p. 5). In this sense, digital literacy represents the functional skills required for operating and communicating with technology.

Theoretical Framework

This section presents the theoretical assumptions that framed this investigation. Each theory offered a unique contribution to the study while collectively they provided a framework through which to examine the complex situation of teachers' understanding of digital literacy integration as revealed during their collaborative planning sessions while they designed their PBL project.

Sociocultural Theoretical Framework

A sociocultural theory provided the overarching frame for this study and supported my attention to the context in which the teachers' planning session occurred; the teachers' interactions that occurred within that context, and the mediation of those actions. For this study, I drew upon the sociocultural perspective of learning and development first outlined by Vygotsky (John-Steiner & Mahn, 1996). According to this framework, human activity occurs within and is shaped by the cultural contexts in which it occurs. The interactions that occur within these contexts are mediated by tools, such as, language and symbols, and are best understood within their historical context (John-Steiner & Mahn, 1996, p. 191; Vygotsky, 1978). For Vygotsky, the learning that occurs within these interactions becomes transformed within the learner, a process Vygotsky referred to as internalization. Thus, learning occurs on two planes; first on a social plane and then a psychological plane (Vygotsky, 1978). Similarly, Wertsch (1991) argued that action cannot be separated from the milieu in which it occurs. Thus, sociocultural theory recognizes a way of thinking about a learner's cognition as taking place within a social context

(Rogoff, 1990, 2003; Vygotsky, 1978; Wertsch, 1991). From this perspective, therefore, human mental functioning does not occur in isolation.

Literacy as Practice

As discussed previously, a sociocultural frame brought attention to the context of the teachers' planning session, the interactions that occurred within the sessions, and the mediation of those actions. Within a literacy as practice frame, literacy is conceived as constructed through practice. Literacy as practice is what people do, not what they learn. In other words, literacy is not conceived simply as knowing how to read and write a particular text, but how to apply that knowledge to accomplish particular purposes in particular contexts of use (Barton, 1994). In my study, this framework helped me to understand how the teachers construed the practice of literacy as reflected in their integration of digital literacies within their PBL unit. Scribner and Cole (1981) introduced the concept of literacy as a practice. According to them, practice is conceptualized as a series of activities using a particular technology and applying a particular system of knowledge. Moreover, these activities are socially developed to accomplish specific tasks. Scribner and Cole (1981) highlighted the importance of understanding the larger social system that includes different kinds of practices developed to accomplish particular tasks within those practices. In other words, considering those practices expands the understanding of literacy development. Literacy from this perspective is "a set of socially organized practices, which makes use of symbol systems and technology for producing and disseminating information" (p. 236). In other words, Scribner and Cole (1981) argued that literacy is not a matter of knowing how to read and write. Instead, in today's technology-rich world, literacy means bringing technology knowledge and skills together within a specific context to accomplish a specific purpose.

Barton and Hamilton (2000) and Street (1984) add that to understand a community's conception of literacy, we should focus on "what people do with literacy" (p.7) rather than the skills they acquire. Similar to Scribner and Cole (1981), these scholars conceive literacy practices as what people do with reading, writing, and texts in real-world contexts (Barton & Hamilton, 2000). These practices, they add, are connected and shaped by the extant culture's values, attitudes, feelings, and transmitted through social relationships. Further Barton and Hamilton (2000) emphasized that literacy practices can only be understood by observing them within the social relationships and institutions in which they occur, meaning different literacies connect to different domains of life, and patterned after the contexts in which these literacies are learned and used.

Situated Learning Theory

I conclude the presentation of my theoretical framework by examining situated learning theory. Whereas a sociocultural view of learning supported my attention to the context of the teachers' planning session, the interactions that occurred within the sessions, and the mediation of those actions and a literacy as practice view guided my examination of the teachers' conceptions of the practice of literacy, a situated learning theory offered a helpful lens through which to examine and interpret the individual teacher's participation and interactions within the broader community of practice, i.e., the third-grade planning team. And it offered a way to examine and interpret the third-grade team's participation and decision-making within the broader community of practice of the school.

Within the last two decades, there has been a shift from an individualistic view of learning to a more social and community-focused view of learning. Many researchers have diverged from cognitive theories, which emphasize the individual and isolated mind while

gravitating towards theories that emphasize the social nature of cognition and meaning (Resnick, 1987). Situated learning theory offers such an emphasis. Situated learning theory stems from cognitive theories and social psychology, which highlight the role of social interaction and the authentic learning that takes place within a specific context, within a learning community (Brown, Collins & Duguid, 1989). Situated learning theory suggests that learning emerges from actions during social engagements that occur within an interactive and collaborative environment (Brown, Collins & Duguid, 1989; Lave & Wenger, 1991; Takahaski, 2011). According to situated theory, learning is an "integral part of social practice in the lived-in-world" (Lave & Wenger, 1991 p.35), which takes place within an individual's mind but as a consequence of her/his social interactions. Through this social and interactive environment, shared meaning is constructed through the learner's agency and participation. Thus, the theoretical framework of situated learning theory that guided this study conceptualizes a view of teachers' planning sessions as teachers engaged in a community of practice where teachers negotiate the purpose and meaning of the project, where teachers are offered opportunities to learn through discussions, and where teachers are engaged in pedagogical reasoning (Horn, 2005, 2007). Wenger (1998) defined a community of practice as a community bound through practice, in which practice serves to bring coherence to the community through mutual engagement, joint enterprise and a shared repertoire of information, resources and experience (p. 73).

While situated learning theory proposes a learning model applicable for both formal and informal settings, Brown, Collins, and Duguid (1989) pointed out the instructional implications of situated learning for classroom practice. In closing, it is important to state that the construct of literacy practice and situated learning theory are complementary and nested within broader sociocultural theories.

Overview of the Study

Teachers need continuous on-site support as they acquire knowledge of technology and 21st century literacies and the skill to integrate technology into their instruction. With the importance of teachers' need for support in their efforts to integrate technology in mind, I examined the complex situation of teachers' understanding of digital literacy integration as revealed during their collaborative professional development planning sessions while they designed their project-based learning (PBL) unit. Participants included a team of third grade teachers who teach in an urban charter school that serves a low-income community. This study used a case study design and qualitative methods. Data collection included observations of planning sessions, researcher reflections and memos, and teacher interviews. Data were analyzed using constant comparative methods.

The organization of this dissertation proceeds as follows. In chapter two, I review the literature that supported my approach to the study. Then, in chapter three, I delineate the methodology and methods I used. In chapter four, I report the study's findings and in chapter five, I discuss the findings and their implications.

2 LITERATURE REVIEW

New Ways of Understanding Literacy

Today we read and write in new ways to reflect new times (Leu, 2016). Digital forms of writing and reading have significantly changed how we interact with texts and as a result, require the acquisition of new skills to engage with these new forms (Corio, Knobel, Lankshear & Leu, 2008; Kress, 2003; Lankshear & Knobel, 2007). Kress (2003) described reading and writing as multimodal because it expands communication beyond traditional paper and pencil formats to include color, sound, image and video and the inclusion of such digital tools as blogs, wikis, and iPads. Similarly, Lankshear and Knobel (2007) argue that digital tools create new literacies, such as engaging in fan fiction, blogging, sharing, remixing artifacts, by providing opportunities to engage with various forms of texts with new purposes. While these new formats and new tools do not negate the uses of print literacies, they do expand the understanding of how print-literacies can be transformed with the use of digital tools (Leander, 2009).

Responding to these changes, professional organizations call for educators to integrate digital technologies into their reading and writing instruction. For instance, the International Literacy Association (ILA), formerly the International Reading Association, promoted such integration in its "New literacies and 21st century technologies" position statement:

> To become fully literate in today's world, students must become proficient in the new literacies of 21st-century technologies. As a result, literacy educators have a responsibility to effectively integrate these new technologies into the curriculum, preparing students for the literacy future they deserve. (ILA, 2009)

Likewise, and perhaps more important to classroom teachers, state curriculum standards support these new skills and digital technology. References to the use of digital tools for literacy

and language arts are integrated throughout the Common Core State Standards (National Governors Association Center [NGA] for Best Practices & Council of Chief State School Officers [CCSSO], 2010). For instance, Anchor Standard Seven for the Reading strand states teachers should: “Integrate and evaluate content presented in diverse formats, including visually and quantitatively as well as in words” (NGA Center, CCSSO, 2010, p. 35). Similarly, Anchor Standard Five for the Speaking and Listening strand states teachers should, “Make strategic use of digital media and digital displays of data to express information and enhance understanding or presentations” (NGA Center & CCSSO, 2010, p. 48). Throughout the standards, references are made for students to incorporate digital technology and to understand the information, conveyed through digital media. In other words, as Dalton (2012) noted, “the standards assume that being literate means being digitally literate” (p. 333). However, even though the Common Core English Language Arts Standards mandate the use of digital technology in the English Language Arts curriculum, its standards neither elaborate on what digital literacies involves nor provides information about how to promote its use.

Given that my study aimed to examine the complex situation of teachers’ understanding of digital literacy integration as revealed during their collaborative planning sessions, I situated my study within the relevant professional literature. Specifically, this review presents research related to understanding how to integrate successfully digital technology in elementary literacy and language arts instruction and summarizes research that examines the state of teacher professional development that assist them to plan and integrate that technology within instruction.

How Digital Tools Supports Literacy Development

The literature review begins with research related to how digital tools support literacy development. Specifically, I examine research related to (1) how integrating digital tools within literacy instruction supports students' reading comprehension, and (2) how integrating digital tools within literacy instruction promotes students' communication, collaborative knowledge construction, and overall literacy learning.

Integrating Digital Tools to Support Reading Comprehension

The research that examines the integration of digital tools revealed that digital tools could be valuable in literacy instruction and can support student's literacy development (Barone & Wright, 2008). Most of that research investigated digital tools' impact on reading comprehension and suggested that integrating digital tools brings authenticity to reading and creates engagement which in turn enhances students' reading comprehension. In this section, I summarize the few studies related to these topics.

The research revealed that the use of digital instruments can boost students' reading comprehension. Multiple tools such as iPads, e-readers, podcasts, and apps are thought to enhance existing literacy practices. For instance, Hutchison, Beschorner and Scmidt-Crawford (2012) conducted a case study and examined the impact of using iPads to support and enhance literacy instruction. The participant was a fourth-grade teacher and her 23 students. Data collected included field notes recorded during classroom observations that occurred three times a week over 6 weeks. The teacher started each lesson with a learning goal and students studied collaboratively with electronic books and apps. The students used iPad apps such as Popplet, which helped them sequence story events, and Doodle Buddy, a drawing app that offers kids a lot of ways to get creative with paints, stamps, and backgrounds. The use of these apps

reinforced the students' use of two reading comprehension strategies: visualization and the identification of a main idea and its supporting details. Strip Designer was used to help the students learn how to retell information, and Sundry Notes was used to help the students learn how to illustrate cause and effect relationships. The findings suggested that the iPads apps encouraged students' nonlinear thinking and in the process the students gained important digital literacy skills such as navigating the hypertexts in the eBooks. Furthermore, these apps provided opportunities different from those provided by paper-based activities. For example, the Popplet app allowed students to sequence story events by shifting text boxes and adding and modifying those boxes. Similarly, many of the iPad apps gave students the opportunity to reread and revise as they worked to create visual texts.

In another study, Vasinda and McLeod (2011) conducted a mixed-methods study that examined the impact creating podcasts had on students' reading comprehension. The participants were six third-grade teachers and their students from a Title-I school. During the 10-week study, students digitally recorded themselves each week reading a readers' theater script and then uploaded the script for podcasting. At the end of the study, the researchers used the Developmental Reading Assessment (DRA) to evaluate the students' reading comprehension. The findings suggested that producing podcasts and posting them online created a wider audience, which added authenticity as well as expanded the audience beyond the classroom. Additionally, this experience created opportunities for the students to self-evaluate their reading fluency and for the students to revise and improve their podcast performance. Finally, the students' performance on the DRA assessment suggested that their use of podcasts increased their reading comprehension.

Other research suggests reading digital books supported the expansion of students' text reading processes, which in turn, enhanced their reading comprehension. In addition, the results of these studies suggest the results occurred because Digital books challenge the linear, right-to-left, and top-down text processing used in most printed texts (Leu, 2002). For example, Larson (2010) conducted a qualitative case study and examined the impact of the use of digital tools for reading online on students' reading comprehension. The participants' were17 second graders who attended school in a low SES school district located in the Midwestern part of the United States. The students read online texts, blogged about their reading experiences, and engaged in online book discussions. Reading e-books, enabled students to adjust sizing, to listen to parts of a story by activating the text-to-speech-feature, to highlight key words and passages, and to add annotations to the text. The researcher found that manipulating text through digital tools enhanced the students' ability to make connections between themselves and the text. Larson also noted that the teacher said she was able to examine the students' reading behaviors and their application of comprehension skills by observing their responses to the e-book tools.

Integrating Digital Tools to Promote Communication, Collaborative Knowledge Construction, and Learning

Another key affordance of digital tools for digital literacies is they involve collaborative construction of knowledge. Although few studies that investigated this affordance of digital tools exist, those I located suggest that using online discussion forums, such as social networking sites, blogs, and Wikis promote collaborative sharing and construction of knowledge. Coldwell and Hutchison found that the online platforms provided opportunities for students to use simultaneously multiple literacy skills such as reading, writing, and analyzing with both traditional and digital texts (2015). In addition, Hansfield and colleagues (2009) conducted a

one-year ethnographic study that examined the teacher's literacy instruction while her students used Comic Creator, a Web 1.0 tool located at ReadWriteThink.org. Comic Creator enabled the students to generate comic strips during a writing unit on graphic novels. The students also used BlogSpot (Web 2.0) to post their responses to their readings. The goal was to encourage students to interact through their writing. The participants were eight native Spanish-speaking fourth grade boys at different stages of English-language development. The students attended a low-income school. During the writing unit, the students blogged, responded to each other's comments, and answered each other's questions. The teacher reported the students were more careful with their writings. For example, when using the comic creator and the BlogSpot website, students who typically did not proofread began adding proper punctuation. In addition, the students critically read their peers' posts and asked their classmates to support their claims. The findings suggested that blogging created space for authentic writing and conversations and engaged the English language learners in writing and conversing.

Similarly, Liu, Liu, Chen, Lin and Chen (2011) conducted a quantitative study that investigated how hypermedia and linear approaches to storytelling influenced students' collaborative learning experience. The participants were 57 third-graders attending a suburban elementary school in Taipei, Taiwan. A linear collaborative storytelling platform provided a sharing space in which all participating students had to organize their stories using a beginning, middle and end format. In this format, students could edit and modify the story on their shared story path. In addition, during collaborative storytelling, hypermedia was used to enhance social interaction among the students. Using this platform appeared to support the students' creation of multiple versions of a story. Also, storytelling seemed to enable the students to compose stories collaboratively in a hypermedia space. The findings suggested that using hypermedia to compose

stories fostered an effective collaboration process, enhanced peer support, and ensured a sense of authorship.

Other research revealed that using a digital platform for communication and discussion spaces enhanced students' social learning and provided equitable opportunities for students to share their ideas. For instance, Larson (2009) conducted a qualitative study in a low SES Midwestern city to examine students' online literature discussions. The participants were a diverse group of 26 fifth-graders, 15 boys and 11 girls. The students were given two choices of historical fiction books to read. Then, they were divided into two book groups, one for each book, to read and respond to each other on a message board. They spent about 30 minutes reading the book and responding in their personal journal. Afterwards, they spent an additional 15-20 minutes discussing and posting their responses to the reading on the discussion board. The findings suggested that while they participated in the discussions they took ownership of and monitored their discussions. The teacher acted as a facilitator. During the discussions, students asked clarifying questions, offered their peers compliments, and shared alternative points of views. The students indicated they felt a responsibility to dig more deeply as they read so they could respond to their classmates. Moreover, the asynchronous discussion format provided equal opportunities for the students to share their ideas. Findings indicated that being a part of an online discussion group fostered the students' learning of new skills such as navigating the website.

Other research suggests that collaborative learning can be mediated by the use of many digital and online tools during language and literacy instruction. For instance, Andes and Claggert (2011) conducted a yearlong writing project and examined students' use of a class Wiki page. The participants were 15 second-graders who attended a Title 1 school. The students were

studied as they used multiple digital resources such as photo editing, PowerPoint, and electronic mail. Their writing preparation followed a problem- solving approach: identifying the statement of a problem (orienting), gathering data about the problem (making connections), creating a plan (coordinating), and evaluating the plan (making sense). The students' reading was assessed by the Reading Benchmark Assessments program. The Wiki page provided spaces for the students to share their projects. Therefore, the class Wiki page served as a space where they posted their work, collaborated with their e-pals, and shared their writing products. The findings suggested that writing for authentic purposes and having an authentic audience motivated the students to read and write. Additionally, the students' performance on the reading assessment suggested their involvement in the wiki project improved their reading achievement scores.

The aforementioned studies highlight the positive benefits to students' literacy learning when teachers integrate digital tools and technology within their literacy instruction. The use of technology integration supported literacy instruction in several ways. The technology provided the students' opportunities to read, write, and converse for authentic purposes, as well as to collaborate and to evaluate critically each other's work. The inclusion of multimodality enhanced students' reading and comprehension (Colwell & Hutchison, 2015). These positive findings illustrated the value of integrating digital technology into literacy instruction. However, the minimal research available suggests a lack of understanding about how to conceptualize and integrate such technology into instruction for teachers to implement and integrate digital technologies. It is important to interpret teachers' understanding of these technologies and their perspective on how to use them into their instruction.

Current State of Professional Development

Given that my study examined the complex situation of teachers' understanding of digital literacy integration as revealed during their collaborative professional development planning sessions while designing their PBL unit, I reviewed the current state of professional development for improving teachers' knowledge and integration of technology within their instruction.

Need for Effective Professional Development

To take advantage of the affordances of technology and digital tools, the research suggests that teachers need professional development that assists them to integrate those tools within their literacy instruction. According to a national survey conducted by Hutchison and Reinking (2011) of 1441 US literacy teachers revealed that literacy teachers conceptualize digital literacy integration primarily as a technical rather than a curricular tool. The teachers viewed integration of digital tools as a way to enhance conventional instructional goals or they viewed it as using technology for its own sake. Similarly, literacy teachers recognized the importance of digital literacy skills and strategies associated with 21st-century literacy, but they did not perceive digital literacies as central to instructional integration. The survey also revealed that 81.6 % of the teachers reported a shortage of professional development related to how to integrate technology, and 73% of the teachers reported that they did not have time to teach students the skills needed to use digital literacies for complex tasks (Hutchison & Reinking, 2011).

While studies such as the foregoing, call attention to teachers' need for professional development opportunities to eliminate constraints to teaching with digital technologies effectively, I sought answers to the following questions related to professional development: What constitutes effective professional development? and, do educators and policymakers agree on the criteria and characteristics of effective professional development?

Traditional professional development models focus on helping teachers acquire the knowledge and skills possessed by more effective teachers (Cochran-Smith & Lytle, 1999; Vescio, Ross, & Adams, 2008). The traditional professional development experience was delivered by experts, usually someone affiliated with a university, and thus removed from the classroom. Once the experts delivered the information, they departed without providing any follow-up support, leaving the teachers to implement the knowledge alone in their classroom (Vescio, Ross, & Adams, 2008). This one-time shot (Clarke & Hollingsworth, 2002) workshop model offered no follow-up or support, yet was presented as a panacea for developing better teaching.

For decades, researchers criticized this one-time shot professional development model. Scholars including Guskey (1986), McLaughlin and Marsh (1990), and Wilson and Berne (1999), and more recently, Day and Sachs (2004) and Schwille and Dembélé (2007) provided persuasive evidence of the ineffectiveness of such pre-packaged or one-shot treatments as a professional development approach. To illustrate, scholars from the American Institutes for Research provided a comprehensive analysis of 1,300 studies to examine the potential effects of professional development on student learning outcomes (Yoon, Duncan, Lee, Scarloss, & Shapley 2007). They found that there is not a common understanding of what constitutes effective professional development.

However, a growing body of research points to numerous characteristics of successful professional development. These include: (a) focus on content, (b) engaging teachers in active learning, (c) aligning the focus with the target teachers' knowledge, (d) matching the focus with school improvement goals, e) incorporating sessions that continue beyond the initial meeting, f) ensuring the sessions are of sufficient duration to support teachers' efforts to implement the new

knowledge within their classrooms, and g) inviting collaborative participation among teachers within the same school, grade level or department (Borko, 2004; Brody & Hadar, 2011; Desimone, 2011; Vescio, Ross & Adam, 2008). In addition to these factors, researchers identified other factors to consider in order to ensure teachers' participation and utilization of their new knowledge and skills. Of relevance to my study, Guskey (1994, 2000; 2003) asserted that teacher planning is important for changing teacher practice and for sustaining that change over time.

According to *Professional Learning in the Learning Profession*, a 2009 report from the NSDC and Stanford School Redesign Network (SRN) (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009), while US teachers participate in as many professional development activities as teachers in other nations, US teachers have fewer opportunities (a) to collaborate with colleagues, (b) to plan instruction during the school day, (c) for learning through peer coaching, and (d) for input into the types of professional learning offered. In the 2004 Schools and Staffing Survey (SASS), US teachers stated that they worked in isolation, attended content-loaded training/workshops, and do not receive effective learning opportunities (Darling-Hammond, et. al., 2009). Further, opportunities for teacher collaboration have recently been declining. In 2000, 34 percent of teachers indicated they worked cooperatively with their colleagues. In 2008, the percentage of teachers who indicated they worked cooperatively with peers had dropped to 16 percent (Darling-Hammond, et. al., 2009).

Other information related to the status of professional learning in the US suggests that changes have occurred in the duration and intensity of professional development experiences. Darling-Hammond et al., (2009) in the previously mentioned professional development report indicated that nationally about 83 percent of teachers engaged in professional development that

professional development focused on content that they taught, however the learning was not intensive. During the 2003-2004 school year, 57 percent of the teachers received fewer than two days (16 hours) of professional development related to the content area they taught within the last 12 months. Only 23 percent of teachers reported that they had 33 hours or more professional development related to the content they taught.

According to Regional Educational Laboratory Southwest report, Yoon et al., (2007) reported that the amount of professional development time that teachers receive affected students' success. In this report, they (2007) reviewed more than 1300 studies and found that when teachers received more than 16 hours of professional development, it had a positive and significant effect on their students' achievement. Other factors they identified that positively affected student achievement included the duration of the professional development sessions, the presence of ongoing feedback, and the opportunity for reflection. A more recent review, The Mirage (2015), conducted by The New Teacher Project (TNTP) provides information about professional development. This review highlighted the importance of feedback sessions that included the identification of steps to pursue next, and opportunities to practice new skills to master. Given the literature review, it is clear that effective professional development should include sufficient and continuous support, active learning opportunities with a focus on content, alignment with school goals, and collaborative participation among teachers.

Community of Practice in Professional Development

Lave and Wenger (1991) introduced the concept of *communities of practice* (CoP). This construct has helped to change the conception of teacher professional development from a focus on *teaching* to a focus on teacher *learning*. Briefly defined, CoP refers to learning that involves a group of people with shared interests and mixed levels of expertise who come together to

accomplish a joint task or activity within an informal environment (Lave & Wenger, 1991). Mutual engagement, joint enterprise, and shared interests serve as key components for the success of a community of practice (Lave & Wenger, 1991; Wenger, 1998). Through engagement and joint work individuals come together and acquire a shared meaning of the joint work within a shared community. Lave and Wenger (1991) coined the term *legitimate peripheral participation* (LPP) to reflect a central defining characteristic of CoP and asserted that LPP serves as a conceptual bridge between the person and the community of practice. LPP describes the process by which newcomers participate with more knowledgeable others. Through continued practice, newcomers acquire the knowledge and skills and gradually move their peripheral participation into full participation (Lave & Wenger, 1991). In other words, the participant moves from the role of observer to one who fully participates (Herrington & Oliver, 2000). Through the process of LPP, newcomers gain access to experts in the target activity and gradually become members of that community of practice (Lave & Wenger, 1991).

New perspectives, such as those described by Lave and Wenger (1991) of the nature of knowledge, learning, and thinking, have shaped current reform movements in education. For example, educators and policymakers discuss how to develop a deeper understanding by situating teachers learning within a meaningful context. For example, Borko (2004) states that effective professional development built around a situated perspective is a "powerful tool and [promotes] a new view of knowledge and thinking" (Putnam & Borko, 2000, p. 4). Professional development from a situated perspective is a non-linear process that enables teachers, and facilitators to work together within the context in which professional development occurs (Borko (2004).

Collaborative Teaching and Learning

A situative learning perspective encompasses my view of teacher learning and offered a lens through which to examine the teachers' participation during their collaborative planning sessions. Moreover, a situative learning perspective offered a framework that allowed me to gain more in-depth information about the nature of the professional development planning sessions. According to Borko (2004), learning is fostered through strong professional communities. These communities can exist in different contexts, such as schools, classroom, and communities outside of schools. Given that the contexts in which people learn serve as the fundamental component of a situative perspective, scholars such as Borko (2004) highlight the need to study learning within those contexts. To garner a full understanding of the situation, one must also examine the individuals as well as the social environment in which they participate.

Proponents (Borko, 2004; Brown, Coolins & Duguid, 1989; Greeno, 1998) of a situative view of teacher learning believe that the context of professional development includes attending to the active learning component that occurs within these contexts. Such learning experiences provide chances for teachers to observe themselves, reflect on their practice, and ultimately transform their teaching. Similarly, Du Four (2004) argues that to create a professional learning community, the focus should be on learning rather than teaching. He condenses professional learning communities into three big ideas. The first is a shift from a focus on teaching to a focus on learning. Second, the need for teachers to reflect continually on their practice to ensure they continue to enhance student learning. Third, self-reflection and examining practice are pivotal to the implementation of effective instructional practices. When teachers explore crucial questions within a professional learning community, guided by Dufour's big ideas, learning is likely to be achieved by all within that community.

A study by Yousef and Dajani (2014) illustrates Du Four's (2004) first two big ideas, the need to focus on learning not teaching and the need to focus on building a culture of collaboration. Yousef and Dajani's (2014) study revealed the benefits accrued to the teachers who participated in a professional learning community. They investigated a group of Palestinian English language teachers' views of collaborative learning communities and the impact of these learning circles on their instructional practices. They found that collaborative learning communities offered the teachers not only the chance to observe, examine, and reflect on their own learning but their colleagues' practices, as well. Hence, their effective collaboration necessitated more than physical togetherness among teachers. Furthermore, their collaborative learning community led to deeper learning and offered opportunities for them to help one another find alternative solutions for their instructional problems. Moreover, the teachers reported that participating in the learning circles improved their ability to talk about their practice and their confidence and cultivated a culture of collaboration and learning among the members of the group.

Finally, Du Four's second big idea is teachers need to seek evidence of their students' learning. He asserts that working together to improve student achievement should be an ongoing process. Teachers need to identify students' current achievement level, establish targeted goals for raising that achievement, and work together to achieve that goal. Borko (2004) argued that strong professional learning communities can foster teacher learning and improve instruction. Borko (2004) referred to The Community Teacher Learners Project (Grossman, Wineburg & Woolworth, 2001; Wineburg & Grossman, 1998) as an example of a strong professional learning community. The Community Teacher Learning Project identified the key components of community formation as developing a group identity for interaction, formulating communal

responsibility for norms and behaviors, and assuming responsibility for colleagues' growth and development (Grossman, Wineburg, & Woolworth, 2001).

As stated previously, a situative approach to professional development has brought attention to the social aspects of learning. A focus on the social aspects of learning draws attention to the concept of interdependence and brings it into the professional development discourse. Members of successful collaborative learning groups are interdependent because their members rely on each other to achieve their goals. Borko (2004) and Westheimer (1999, 2008) build on this idea of interdependence by emphasizing the importance of educating teachers as individual learners while extending their professional learning throughout the participatory community culture. Through collaboration, teacher professional communities serve as a catalyst for creating a school culture in which social transformation takes place. Westheimer (1999, 2008) goes further and asserts it is a way to transform society by creating school cultures in which the students and teachers value collaborative projects and where teachers and students learn tolerance, the value of participation, and skills crucial for a pluralist society (Westheimer, 2008).

However, barriers to collaboration exist. Schools often contain structural and political structures that impede teachers' attempts to form participatory collaborative communities (Darling-Hammond, et. al., 2009). Teacher isolation imposes a major threat to teacher collaboration. Elmore and Burney (1997) named teacher isolation as the "greatest enemy of instructional improvement" (p. 268). In a typical instructional day, teachers rarely get opportunities to work and engage in collaborative practice (Darling-Hammond, et. al., 2009). Besides structural challenges; busy schedules, physical isolation, and a feeling of vulnerability reinforce teachers feeling of isolation (Little, 1990). Westheimer (2008) introduced six

interconnected goals for developing professional learning communities to minimize isolation: (1) improve teacher practice so students will learn; (2) create a culture of intellectual inquiry by making ideas matter to students and teachers; (3) include teachers in school leadership and school management; (4) promote teacher learning among novice teachers; (5) work to reduce teacher isolation and alienation; and (6) focus on the principles of social justice and democracy (p. 759). Westheimer (2008) concluded that teachers are not only responsible for creating effective learning environments for their students but they should assert responsibility for creating environments that promote their professional development. Reforms in professional learning begin with the recognition that teachers, like their students, are learners. Ideally, teachers' learning opportunities start during their first in-service experience and continues throughout their professional career (Cochran-Smith, 2005).

Throughout the literature, collaboration, and teacher learning have been emphasized as main tenets for effective professional development. Teacher learning is enhanced when teachers create communities of practice within their schools (Elmore & Burney 1997). Collaborative professional learning environments are spaces that could help teachers understand how to incorporate various technologies to create authentic teaching and learning opportunities. Such opportunities could support teachers' efforts to integrate digital technology into their instruction (Colwell & Hutchison 2015) and support my research focus.

Planning

In my study, I examined teachers' understanding of digital literacy integration as revealed during their collaborative professional development planning sessions. For that reason, I reviewed the available research related to teacher planning. To garner information relevant to my study, I organized my review around the following questions:

"How can elementary teachers planning be described?" and "How do elementary teachers interact in their planning sessions?".

What is Teacher Planning and What Does It Involve?

Tapping into teachers' thinking and understanding of how they translate concepts into their instruction is not easy. Given that effective planning is essential for effective teaching, research suggests that examining teachers' planning offers one way this can be accomplished (Clark & Peterson, 1986).

While few definitions of planning exist in the professional literature, generally teacher planning can be described as both a psychological process and a practical activity (Wolcott, 1994). According to Clark and Peterson (1986), planning is a process in which a person visualizes the future, conceives a goal and the means to accomplish that goal, and then constructs a framework to guide his or her future action to achieve the goal (p. 260). As a practical activity, planning is less precisely defined as "the things that teachers do when they say they are planning (Clark & Peterson, 1986, p. 260)

While few studies exist related to teacher planning, it was important for me to examine why and how teachers plan. A few researchers have examined the reasons behind teacher planning. Wolcott (1994), from his study that examined why teachers plan, concluded that teachers plan to feel well prepared, to provide a structure for their teaching, and to fulfill their requirement to teach. Clark and Yinger (1979) conducted a case study that examined teachers' planning practices, their judgments in planning, and the relationship between their planning and implementation of instruction. The participants were six upper grade elementary teachers. They found that teachers planned to satisfy immediate psychological needs such as increasing a sense

of security, relieving anxiety, or building confidence. In addition, they found that teachers plan to prepare themselves for instruction and to create a framework to guide their behavior.

What Influences Planning?

Many factors influence teacher planning. First, planning is a chaotic and non-linear process (Kimmel, 2012; Wolcott, 1994). While some prescribed steps and procedures might guide the behavior of teachers in instruction, it is a complex mental activity that necessitates teachers to engage in reflective thinking (McCutcheon, 1980). Kimmel (2012) conducted an ethnographic study and examined how a team of second-grade teachers and a school librarian organized their planning meetings. Block grade-level planning meetings between teachers and the school librarian were held monthly. In total, eight meetings occurred and each meeting lasted two hours. The findings suggested that the group's planning resembled problem solving with the statement of a problem (orienting), gathering data about the problem (making connections), creating a plan (coordinating), and evaluating the plan (making sense). Interestingly, while McCutcheon (1980) documented that some teachers limited their written plans to an outline or a list of topics they checked off as they were completed, she also found that the teachers formed mental images of plans, and that the images were nested or embedded within more comprehensive planning images. In other words, teachers mentally reviewed their plans to elaborate on their initial ideas. Similarly, Clark and Yinger (1979) described teacher planning as a successive, recursive, and cyclical process influenced by a teacher's prior experience.

Brown (1988) conducted a descriptive case study that examined the structure of teachers' planning decisions, the teachers' use of a rational model of planning, and factors that influenced teachers' planning decisions. The participants were 12 middle school teachers from three different schools. The teachers were interviewed about their past and future planning decisions,

they completed a questionnaire related to planning selected units, and they were asked to describe their planning aloud. The findings suggested that teachers often reflected on their prior experiences and pulled from what worked in the past to use in their plans for future lessons. They surmised that experience helped the teachers reflect on how they could improve teaching. McCutcheon's (1980) referred to this type of mental planning as "reflecting on the past and envisioning what might occur in current and subsequent lessons" (p.11) Other research suggests that teachers' planning also is influenced by the contexts in which teachers work. Examples of such influences include school schedules, instructional materials, standardized tests, curriculum guidelines, physical facilities, and student characteristics (Brown, 1988; McCutcheon, 1980; Warren, 2000; Wolcott, 1994). In addition, the interest and abilities of students shape teachers' planning. Similarly, McCutcheon (1980) suggested that teachers plan to make the curriculum fit the needs of all students.

For example, Clark and Yinger (1979) conducted a case study and examined teacher planning practices and the relationship between teacher planning and the implementation of instruction. The participants were six upper elementary teachers. The teachers kept journals documenting their planning and thinking. Data were also collected through biweekly interviews and classroom observations. The findings suggested that some teachers spent the first few weeks of school reviewing their students' behavior, their needs, and their motivation for learning. They used the needs of their students to guide their planning.

What are Challenges to Teacher's Planning?

Challenges exist to teacher planning. Poor administrative supports, lack of time, and additional school schedules are three main barriers to teacher planning (Brown, 1988; Dever & Lash, 2013; McCutcheon, 1980). In addition, unpredictable events, such as when administrators

change the daily school schedule, challenge teacher planning. When this occurs, teachers must adjust their schedules and time according to their administrators' request to accommodate additional school activities such as aligning test schedules, completing paperwork, or organizing field trips (Dever & Lash, 2013; McCutcheon, 1980). These interruptions force teachers to take into account what students would miss when such adjustments are made and plan when to include missed lessons.

Additionally, lack of guidance and support from the school's administration create challenges to teachers' planning. Dever and Lash (2013) conducted an in-depth case study and examined how middle school teachers used common planning time to cultivate professional learning opportunities. The participants were five teachers within one eighth-grade team. The teachers met twice per week and discussed the purpose of designing interdisciplinary units, student affairs, and day-to-day-issues. The findings showed that the teachers continuously stated their desire for administrator support for their autonomy in making instructional decisions and sharing resources for a successful planning and instruction.

What Works for Teachers?

How could planning be used to improve instruction and schooling? Research suggests that collaboration between teachers and administrators is critical. From the research, we learn that teachers share similar concerns such as school interruptions, difficulties stemming from policies on scheduling, and insufficient resources (Brown, 1988). These concerns influence instructional decisions during the planning process. During collaborative planning, teachers can work together to solve common problems, and to examine relevant concerns and needs while planning. To illustrate, Pella (2011) conducted a case study and examined the nature of participants' situated engagements in their collaborative inquiry about teaching writing. The

participants were four teachers who participated in the National Writing Project and who were interested in improving their writing instruction. During the planning meetings, participants shared with each other their experiences and resources they had acquired from their respective training and workshops. They engaged in recursive interaction between their shared experiences and their prior experiences teaching writing. The findings suggested that the teachers synthesized the knowledge they had gathered individually from multiple contexts to co-construct new knowledge for teaching writing. Through co-planning, observations, and collaborative analysis of student work, teachers realized they viewed their students as deficient and because of these views they lowered their expectations of what these students could accomplish.

Collaborative involvement in planning can assist teachers in making decisions about instructional materials and classroom resources, as well as in creating schedules to improve instruction and schooling for their students (McCutcheon, 1980). Furthermore, when teachers and administrators' come together to solve shared problems teachers are empowered and develop a sense of autonomy in their teaching.

While planning is an important component to effective instruction there is a dearth of studies that examine planning for technology integration. Hutchison and Colwell (2016) assert that when planning to integrate technology, it is important to consider the academic content first and then select digital tools that align with that content and their pedagogical goals. Similarly, Gormley and McDermott (2013) conducted a case study that examined the structure of lessons when teachers planned to integrate digital literacies. The participants were 12 teachers attending graduate school who were participating in an afterschool practicum over a six-week period. Students in the program were struggling readers and writers. The researchers were interested in the structural elements of an after-school digital literacies program. The lessons the teachers

planned included lesson openings, which was a challenging question related to the instructional theme. The second structural element of teachers' lessons was a focus on the students' fluency. During this part of the lesson, the students assessed their fluency by recording their reading on the Audacity website. Then, they had the students create graphic panels using the website Kerpoorf. Teacher highlighted that thinking and planning the lessons provided opportunities for them to learn how to integrate these literacies into their teaching. In addition, the findings suggested that the digital literacies emphasized the social nature of learning, and that almost all children worked collaboratively as they read, composed and searched the Internet for information.

Given there is dearth of study on teacher planning, my study aimed to shed light on planning process and teacher interactions. It highlighted some of the complexities involved in teachers' collaborative planning process and including technology into planning and instruction. This research also provided a model of collaborative planning and technology integration for elementary education in schools. This study examined teacher interactions and found that opportunities to collaborate and discuss each aspect of the planning and implementation process contributed to teacher learning. Creating teacher learning communities where they collaborate with one another offered explanations how and why collaboration can support teacher learning, student outcomes and school improvement.

3 RESEARCH DESIGN

This study's research design relied on a qualitative approach. Qualitative research embraces the philosophical assumption that, "to understand a complex phenomenon, you must consider the multiple 'realities' experienced by the participants themselves-the-insider perspective" (Suter, 2011, p. 344). I positioned this study within the interpretivist paradigm, which assumes "reality is socially constructed, that there is no single, observable reality. Rather, there are multiple realities or interpretations of a single event" (Merriam, 2009, p. 8). According to Guba (1990) interpretivist ontology is "relativist, which assumes realities exist in the form of multiple constructions, socially and experientially based, local and specific [are] dependent for their form and content on the persons who hold them" (p. 27). Additionally, interpretivism aligns with a subjective epistemology (Denzin & Lincoln, 2011) meaning, knowledge is gained and shaped by personal experiences, that come from particular situations and stem from interactions with others (Denzin, 1978). According to this paradigm, meaning and actions are intertwined with the context (Eisenhart, 1988). While several theoretical and methodological designs can be used within this tradition, I chose a case study methodology, which helped me gain an in-depth look into the phenomenon of interest and capture elementary teachers' understanding of digital literacy integration as revealed during their collaborative professional development planning sessions while designing their PBL unit. In this study, the teacher participants served as a bounded system (Merriam, 2009). Within a case study design, a bounded system (Smith, 1978) is defined as a single entity or a unit around which there are boundaries, such as a single person, a program, institution, or a community, etc. My intent was to understand a bounded system. In this study, third grade teachers who collaboratively planned, met the requirements for a single case. Specifically, this study addressed the following research questions:

1. How can elementary teachers planning be described?
2. How do elementary teachers interact in their planning sessions?
3. What understanding of digital literacy is implied in how the teachers integrate technology in their planning sessions?

In this chapter, I describe the relevance to my study of using a case study approach complemented with qualitative methodologies and the specifics of my study.

Methodology

Case Study

For this study, I focused on third-grade teachers' understanding of how to plan collaboratively to integrate technology into their PBL unit. A case study approach allowed me to create an in-depth description of the teachers' experiences and to analyze them as a bounded system (Merriam, 2009). In a similar vein, Yin (2008) defined a case study in terms of the research process, "A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (p. 18).

I present specific features of case study methodology to justify its use in this study. The particularistic nature (Merriam, 2009) of a case study design supported my focus on the teachers' interactions and experiences during a particular time, i.e., their planning times. I used "thick descriptions" (Merriam, 2009) and included as many observable variables as possible to portray the teachers' understanding of technology integration and experiences across time as they planned one PBL unit. This case study approach extended my interpretation and led me to rethink the phenomena I investigated. Specifically, it deepened my interpretations and reflections of integrating digital literacies into instruction. During an iterative cycle of observations and

reflections, I was able using a case study design to capture the complex interactions, perceptions, and interpretations of the teachers. The narratives and descriptions garnered from a case study design allowed me to investigate how teachers collaboratively planned to integrate technology within a PBL unit as they as they engaged in their planning sessions. Furthermore, Bogdan and Biklen (2007) differentiated case studies according to functions and types. My study was an observational case study in which "the major data-gathering technique is participant observation with formal and informal interviews and the focus of the study is on a school" (Bogdan & Biklen, 2007, p. 60).

For this study, I also utilized qualitative methods, specifically participant observation and interviews to provide an in-depth examination of the data. These methods support a case study methodology by upholding the richness and authenticity of the teachers' behavior and interactions during their planning session (Bogdan& Biklen, 2007; LeCompte& Preissle, 1984). The case study design and the qualitative methods aligned with my sociocultural stance. In addition, the qualitative methods helped me describe the individual teacher's behavior within the school culture (Bogdan & Biklen, 2007). Looking closely into the teachers' planning sessions provided access to their views and understandings. My purpose was to grasp their points of view and their vision for integrating digital literacy practices in their instruction as revealed during their planning sessions.

Methods

This section describes the setting, the participants, data collection methods, and data analysis procedures. In addition, I include the timeline for data collection and analysis and discuss strategies I incorporated to ensure the trustworthiness of the study's findings.

Setting

The study took place in a STEAM-focused, urban charter school in a large southeastern metropolitan area. I chose this school for two main reasons. First, I served as a research assistant within an ICS grant implemented within the school. I was a familiar face in the school, and I had worked closely with the third, fourth and fifth grade teachers during the two years prior to my study. Therefore, I already had a relationship with these teachers. Second, this group of teachers had a unique school environment which encompassed three elements of effective instruction; continuous teacher support, collaborative work opportunities and PBL integration for their instruction preparation. The existence of these three elements in urban schools which serve low SES communities are not common in schools. For that reason, this school provided a distinct school environment to conduct my study.

In 2014, Parker Academy (pseudonym) was converted from a public school to a charter school. The school serves a low-income community (64% free and reduced-priced lunch and 17% transitional home situations) and a predominant African American population (85% African American, 5% white, 4% two or more races, 3% Asian, and 3% Hispanic) (Department of Education, 2014). The school is a year-round school, with 9-week quarters separated by intercessions during which time some students receive supplementary instruction while others participate in STEAM camps. The camps in which the students participate offer project-based and STEAM-focused designed-based learning activities.

Since the school converted to a charter school prior to the 2014 - 2015 academic year, it has gone through changes as it establishes its identity as a charter school. One change represents the school's adoption of an instructional model guided by principles of design thinking and project-based learning. To that end, in the 2016-2017 school year, the entire school converted to project-based learning (PBL). To support this conversion, the school administrators and

classroom teachers received continuous professional development through the Buck Institute for Education (BIE). BIE is a not-for-profit organization that offers professional development for designing, assessing, and managing the development of PBL learning projects. Even though BIE provided the teachers five days of PD during the 2016 summer, near the beginning of the 2016-2017 school year, BIE personnel were not physically in the school. Rather, they provided support as needed virtually. The school's academic director oversaw the PBL projects.

In addition to adopting an instructional model guided by principles of design thinking and project-based learning, the school participated in the Integrated Computer Science (ICS) grant--a three-year grant funded by the U.S. National Science Foundation (NSF) and led by Dr. Caitlin McMunn Dooley, who at the grant's initiation was an associate professor at Georgia State University. The purpose of the grant was to increase teachers and students (grades 3-5) capacity and affinity for computer science and STEAM fields through project-based learning and to inform the creation of a model for curriculum development that integrates technology, computational thinking, and computer science. The grant team consisted of a postdoctoral researcher, who oversaw grant implementation, and two contractors. One of the contractors specialized in design-based thinking instruction and the design and development of standard-based lesson plans and assignments. The design-learning consultant created the cloud-based project management tool used. The second contractor, on the faculty of one of the partner research universities, served as the Associate Director of Technology. This contractor provided technical support to the grade-level teacher teams. For the first one and half years of the ICS grant, the grant team provided professional development. During the professional development, the teachers were introduced to designed-based thinking, presented with ways to integrate International Society for Technology in Education (ISTE) standards, and introduced to

computational thinking. The role of the grant team changed after the school adopted a PBL instructional model. When the school became a PBL school, the grant team provided the teachers support in integrating computational thinking and ISTE standards within their PBL planning.

Participants

Participants in the study included all teachers on the third-grade team; all had participated in the observed PLB planning sessions. Focusing my study on the teachers as they planned enabled me to examine their understanding of digital literacy integration and to gain insights into how the teachers made meaning of digital literacy instruction. Given that only third – fifth grade teachers implement PBL, I drew my participants for this study from this population.

Prior to beginning the study, I recruited and then consented the third-grade teachers as my participants. The teachers at this grade level possessed different levels of teaching experience and different levels of experience with PBL. All were in their twenties or early thirties, and they were a racially diverse group. Some, but not all, of the teachers worked with the ICS grant team and were familiar with the main focuses of the grant: design-based instruction and computational thinking. The others were new to project-based learning and the grant.

Other participants included others who participated in the PBL planning sessions, but were not study participants. This included the grade-level instructional coach, the school's academic director, the ICS grant postdoctoral researcher, and the two contractors. Although these individuals were present during the planning sessions, their participation was limited to providing technical support for the grant and for integrating computational thinking and the ISTE standards into the project.

Data Collection

Data collected for this study included (a) field notes from observations of the teachers' planning sessions; (b) researcher memos noting my reflections from these training/planning sessions; (c) teachers' end-of-project reflections and (d) teacher interviews.

It is important to acknowledge that it was not possible to capture every minute detail of the conversations that occurred among the teachers during their planning sessions. For that reason, I mainly focused on the conversations that took place related to their negotiations of planning, their conversations related to the decisions they made about unit activities, and any other discussions related to their unit planning. For example, I focused on the new teachers' statements, when the new teachers joined the conversations, as well as the experienced and core teachers' responses and initiations in the discussions. I also audio recorded all teacher planning sessions and interviews so that if needed I could go back to any conversations. Table 1 illustrates the alignment of the data collection methods with the study's research questions.

Table 1 Data Sources

Research Questions	Observation/ Field notes	Researcher Reflections & Memos	Interviews
How can elementary teachers planning be described?			
How do elementary teachers interact in their planning sessions?			
What understanding of digital literacy is implied in how the			

teachers integrate in their planning sessions?	

The timeline in Table 2 provides a general progression of the proposed study. The teachers plan two PBL projects each year, one each school semester. I observed the planning sessions in which the second PBL project was created; thus, the teachers brought to their second semester planning sessions experience working as a team and experience planning a PBL unit.

Table 2 Timeline of Data Collection

Phase 1 December through Mid-January 2016-2017	• IRB Approval • Presented study to staff and leadership • Consented teachers
Phase 2 January 2017 (week 1) Half Hero Day	• Observed and took field notes 4x/ week during one hour planning sessions
January 2017 (week 2) PBL Core Support Meetings	• Started daily analytic memo writing and reflection logs
January 2017 (Week 3) Planning (Cancelled)	• Started analysis of data
February 2017 (week 4) Planning	• Observed and took field notes 1x/ week during one hour planning time
February 2017 (week 5) Planning	• Observed and took field notes 1x/ week during one hour planning time
February 2017 (week 6) Planning and Academic Project Presentations/ Gallery Walk	• Observed and took field notes during project presentation meeting all three grade levels (3th-4th-5th)
February 2017 (week 7) Planning	• Observed and took field notes during half teacher planning day

	• Continued data analysis, and writing analytic memos and entries in reflection logs
March 2017 (week 7) Half Hero Day	• Observed and took field notes 2x/ week during the one hour planning time
March 2017 (week 8) Planning (Cancelled)	• Observed and took field notes during half day session (presentation prep and final products)
March 2017 (week 9) Icurate/ Applied Learning Demonstration	• Observed, took field notes, and collected images/artifacts during Icurate presentations and the PBL process reflection panel
March 2017 (week 10) Debriefing Meetings/ Formal Interview	• Conducted five formal interviews, one with each teacher • Continued data analysis, analytic memo writing and recording reflection in log
Phase 3 April 2017-May 2018 Data Analysis/ Writing Results	• Continued to analyze data • Wrote results

Observations of planning sessions. I observed for ten weeks, the time period in which the teachers planned and implemented their PBL unit. My observations began on January 11th, 2017 and ended on April 27th, 2017. PBL planning encompassed three different types of teacher meetings that I observed. I observed five regular grade level meetings; two Half Hero day meetings, and one Gallery walk meeting. Half Hero days occurred twice and Gallery walk meetings occurred one time during the project; During these meetings, teachers from all grades came together, worked collaboratively, and debriefed their project planning in details to the rest

of the school teachers. During these meetings, I focused my observations on the teachers' discussions, their negotiations of decision making process related to the choice of activities. These meetings occurred for approximately one hour each. I also observed Icurate demonstrations when at the project's completion, the students presented their projects to their families and the school community. The Icurate exhibit took place after school and lasted approximately 2.5 hours. I focused my observations during the Icurate exhibition on the students' work for evidence of the teachers planned project activities. Collectively, I observed for a total of 15 hours.

As a participant observer, during the planning sessions, I sat apart from the group in the back of the room, but close enough to hear the teachers' conversations. I neither participated nor interrupted the planning sessions. In addition, I did not initiate communication with the teachers during the sessions. However, because of my role in the ICT grant, I answered questions they asked that sought clarification about ICS grant topics. I observed the entire planning sessions, from beginning to end. During the observations, I recorded field notes using my computer. They were in the form of narratives that included participant talk and action. As DeWalt and DeWalt (2011) stated, my intent was to use "a strategy that can allow [me] to discover the existence of patterns of thought and behavior" (p.126). To that end, I also included any questions or reflections that arouse during my observations.

As a participant observer in the Half Hero Days and Gallery Walks day, I sat near my third-grade team and observed their interactions, took field-notes. When the teachers had side conversations, I also walked around the room and familiarized myself with other grade's projects. I focused my observations on the teacher conversations, specifically discussions on

how they finalize a decision and whether they collaborate during this decision process. After each observation, I reviewed my field notes and added any clarifying information.

Reflections and memos. As Denzin (1978) claims researcher introspection involves the researcher reflecting on research activities and the research context. Thus, I recorded regularly my reflections and the decisions I made while in the research context. After each observation, I reviewed my field notes and added any questions I had about the meaning of what I observed, or if I was unsure if I captured enough information, I recorded a memo noting those questions and concerns. I also recorded any other thoughts about my data collection, the data itself, or thoughts about what I might observe during subsequent sessions (Bogdan & Biklen, 2007). These reflections, notes and memos became data that helped me reflect upon the observations when I began my data analysis (Bogdan & Biklen, 2007).

Interviews. At the end of PBL project completion, I conducted a semi-structured, face-to-face, open-ended interview with each teacher participant. The interviews allowed the teachers to share their reflections, their perspectives about the planning sessions, their views about technology integration, as well as their thoughts about the process used to plan their PBL project. Given that I conducted the teacher interviews when the PBL project planning was completed, the interviews served as a kind of debriefing of their planning experiences. The interviews lasted between 20 to 30 minutes and were audio recorded. I transcribed them within a week, and I included any related reflections and notes in the transcriptions. The interview questions included open-ended, exploratory questions so that insights and new information could emerge (Merriam, 2009). (Appendices A). Spradley (1979) maintained that interviews provide a way to learn about participants' subjective views. By teacher choice, the interviews took place in the back of the media center. This was a quiet place that ensured privacy. Teachers set the times for the

interviews according to their students transitions to physical education.or during lunch times. During the interviews, I endeavored to listen more than talk. I used the interviews to confirm that my notes represented an accurate depiction of my assumptions related to the teachers' experiences. The interviews enabled me to understand their experiences and offered them a chance to verify my interpretations (Rubin & Rubin, 2011). Specifically, the interviews enabled me to understand better (a) how the teachers used digital literacy (b) the challenges the teachers faced (c) the teachers' considerations while planning to integrate digital literacy in the instruction and (d) the effects of collaborative planning on their instruction and technology integration.

Audit trail. I kept an audit trail during my data collection period. Maintaining an audit trail allowed me to record my decisions, justifications for those decisions, and explanations of changes made to study procedures. Keeping an audit trail allowed me to chronicle the research process and provided verifiability for the data. Finally, an audit trail helped me to minimize possible biases and to maximize accuracy of the research process (Lub, 2015; Patton, 2002).

Data Management

This study resulted in the collection of large quantities of data. As Merriam (2009) suggests, I created an inventory of the entire data set. I wanted to know what data I had in terms of field notes, reflections, and memos. All of my documents were saved in Dropbox, a cloud storage system. Similarly, I used Dedoose, a visual data organizer to aid in managing and organizing my data. Gradually I transferred and coded the data in Dedoose. My previous experience with this web app allowed me to easily navigate, sort, and make sense of data.

Data Analysis

Data analysis began with the inception of the study and continued until additional data served to confirm my emerging understandings. During data collection, I analyzed and read the

data multiple times. I analyzed data using procedures in line with constant comparative methods as described by Saldana (2016) and Strauss and Corbin (1990). Such methods allowed for an iterative, recursive, and deductive analytic process resulting in a dynamic analysis of the data. This iterative and recursive process allowed me to refine my analysis on an ongoing basis (Merriam, 2009).

Prior to data analysis, I prepared the data for analysis. I created three stacks of print outs for each data set, such as field notes, interviews, and reflections and memos. Additionally, I started a data analysis log to document my thinking and decisions. For instance, on Day 1, as I read through my data, I jotted down my hypotheses, expectations, and possible code names that I thought might emerge from the first round of data analysis.

Given that qualitative data analysis occurred through multiple rounds of reading, sorting, coding, and writing memos; the description that follows offers a general illustration of my data analysis process. Generally, my data analysis occurred in two cycles. During the first cycle, I inductively analyzed my data as I searched for patterns within the data (Bogdan & Biklen, 2007). My aim at this time was to dive into the raw data prior to generating my own interpretations. First my data analysis began with me reading and rereading my field notes and teacher interviews. Reading through the raw data helped me to get a sense of the data (Merriam, 2009). At this initial stage of cycle 1 analysis, I read the data keeping in mind that everything had the chance to be potentially important. After multiple readings of the data, I identified major instances, i.e., those that contained similar patterns. Once I had identified several instances, I reviewed them for patterns, for example, instances where teachers talked about "change" in the planned activities. Throughout this process, I recorded my reflections of my analyses in my analytic memos (Emerson, Fretz & Shaw, 1995). As an example, on February 8th, 2018, after

multiple readings of my field notes generated during my observations of the teachers' planning sessions, I realized that my entries for Jennifer were longer than my entries for the other teachers. Although longer, her statements provided minimal information related to the teachers' relationships or the planning process. In contrast Kate, whose entries were shorter contained more complex sentences and information about the teachers' relationships or planning process. Once I became aware of these differences, I realized I needed to dig more deeply during my next round of reading. This allowed me to begin to think about the entire corpus of data and make connections between teacher conversations as well as different data types such as field-notes and interviews. Before the next round of reading, I continued to reflect and record memos of my thoughts about the analysis and the procedures applied (Strauss & Corbin, 1990). As LeCompte and Preissle (1993) suggest, working with data is like constructing a jigsaw puzzle. Next, I used initial coding which allowed me to examine the data closely so that larger portions of data could be separated into smaller portions compared. This enabled me to categorize the data into larger units such as planning, collaboration, teacher, technology integration, and glitches and to create code names. At this stage, patterns and broad codes emerged. These broad codes served as first entry points into reorganizing and conceptualizing the data. I noticed significant overlap in the codes, so I then identified parts of the data which represented various dimensions of collaborative planning and technology integration. It was during this time that I created a definition document where I defined and differentiated each code to eliminate confusion and my biases.

The last part of the initial coding of my field notes and interviews, I developed sub-codes by looking for themes/ patterns that emerged across the codes. I continued this cycle of data analysis until I felt confident that the data had been unpacked for me to make general statements.

Through this process, I documented my steps and recorded these statements daily in my data reflection log. One of the important steps I applied toward the end of the initial coding cycles, was when I isolated the interview data and focused specifically on the teachers' statements to develop an understanding of their perspectives of digital literacies and technology integration. Throughout this initial cycle, I continuously asked myself questions like the following:

- What happens when teacher's plan together?
- How do they interact with each other?
- What are the steps of these planning sessions?
- What do they consider first?
- How do they proceed in their planning and come to a conclusion?
- Where and when do they consider integrating technology?

Cycle one analysis resulted in 7 big codes and 35 sub codes. I included a screenshot of Dedoose's packed code cloud image to help to illustrate the occurrences of these codes. Figure 1 provides a visual reference of all codes generated during Cycle 1 analysis.

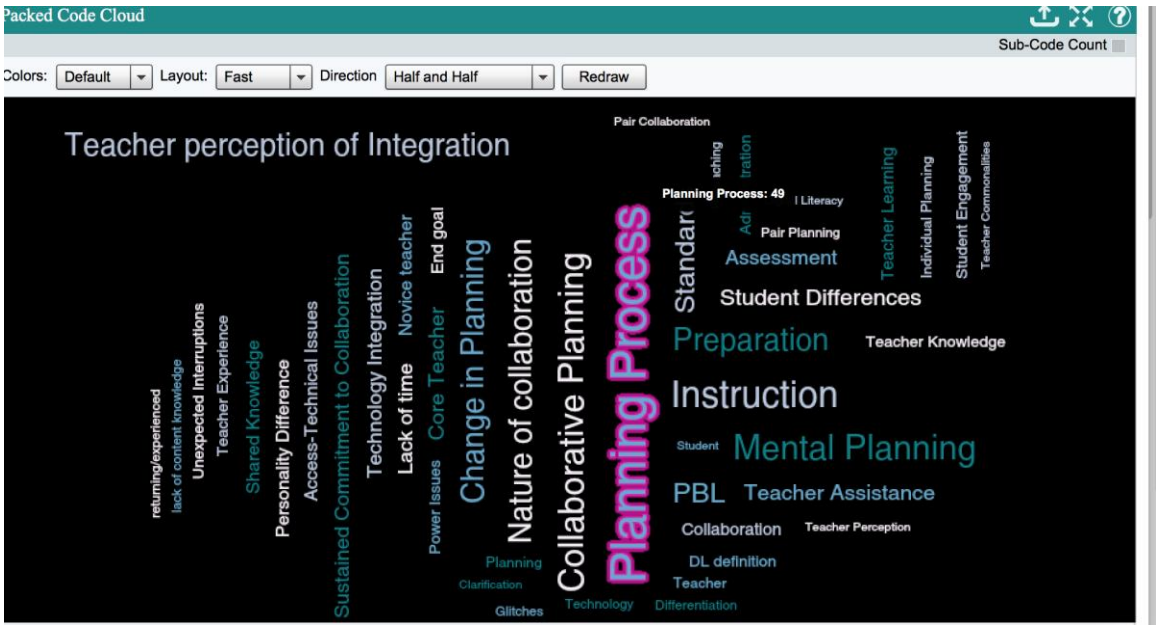

Figure 1 Packed Code Cloud of Data Analysis Cycle 1

Once the first cycle of data analysis was completed, I moved to cycle two. During this round, I unpacked my data further by combining open coding with axial coding. Axial coding allowed me to open the data wherein I matched, compared, and constructed, and then deconstructed the data (Saldana, 2016). I cleaned up the initial open coding and used the codes as I reread and divided the data into logical sections. Like cycle 1 analysis, cycle 2 analysis had several iterative cycles. I confirmed the codes' representations in the data. Simultaneously, I continued to document my reflections and when I needed clarification, I reread the related literature to deepen my analysis. This process continued until themes emerged that explained the phenomenon studied (Merriam, 2009; Strauss & Corbin, 1990). I looked closely at the relationship of one code/theme to another. For example, I asked how this code was different from another code, and which codes and themes reflected similar ideas. Next, to refine and trim the data I revisited the data with a selective focus on topics of particular relevance to my research questions, such as collaboration, planning, digital literacy, and perceptions of digital literacy definition Towards the end of cycle 2 of my analysis, I merged, collapsed, and reparented some

codes. To illustrate; I collapsed data coded under Digital Literacy Definition under Teacher Knowledge, and I merged Assessments with Standards and I reparented End Goal, Mental Planning, and Preparation under Planning Process. This resulted in 3 codes, 9 sub codes and 405 excerpts. Table 3 provides the lists of final codes and themes.

Table 3 Final Codes and Themes

Themes
Planning: A Dynamic and Nonlinear Process
Planning: Internal and External Factors
Internal Factors
Mental Planning Preparation Teacher Experience
External Factors
Student Perspective Assessment/Standards PBL Administration
Planning: A Multitude of Expressions
Collaborative Planning Individual Planning Pair Planning
Planning: A Nonlinear and Iterative Cycle
Technology Integration: Collaborative Exploration
Teacher Instruction Differentiation Conceptualization of Technology Integration Definition: Digital Literacy
Constraints: Roadblocks
Infrastructure Lack of Time Personality Difference Lack of Shared Knowledge

As a final step in the analysis process, I created an "overall themes" chart which included all codes, sub-codes, and phrases from my field notes and interviews. This chart enabled me to describe the findings by looking across the themes. I also used this final chart during writing my data analysis in Chapter 4.

Researcher Role and Perspective

I am a Turkish female with experience as an early childhood educator who has lived in the United States for 14 years. I was the participant observer in this study. Given that the goal for my research was to develop an understanding of the phenomena under study that was objective and accurate, I assumed the role of a moderate participant (DeWalt & DeWalt, 2011) who interacted occasionally with the study participants. This was in contrast to assuming a more active role, which could have limited my ability to capture the teachers' conversations and interactions. I attempted to recognize my biases and subjectivities through an iterative cycle of reflecting and writing memos during data collection. To Illustrate, as I read through my initial transcripts, I realized that I focused on Jennifer who talked more than the other new teachers who were quiet during discussions. Once I realized this, I documented which teachers I focused on to ensure I paid attention to the quieter teachers even when they were not involved in the conversations.

My entry into the study setting was facilitated by my previous relationship with the teachers given my role in the ICT grant. As a member of the ICT team, I had conducted observations, attended leadership meetings, as well as assisted the postdoctoral researcher with research and dissemination of grant information. While these experiences helped me develop a relationship with the school community, it also affected my participant observer role. For

example, Sarah was the only teacher of the five study participants whom I knew from my previous work in the school on the ICS grant. I met her two years prior to my study at the beginning of the ICS project and up to the end of the grant continued to work with her in grant responsibilities. I recognized that this might result in my positive perception about her teaching and participation during discussions. To minimize this potential bias, I tried to capture fair amount of conversations from each teacher.

Prior to my study, I worked as a graduate research assistant on the ICS grant. The third year of the grant project was taking place during the time I collected data. Considering my involvement in the ICS grant, I discuss the differences in the purposes of the grant and the purpose of my study and the differences in my responsibilities in both. The purpose of the ICS grant was to increase the capacity and affinity of teachers and students (grades 3-5) for computer science and STEAM fields through project-based learning and to inform a model for curriculum development that integrates technology, computational thinking, and computer science. The purpose of my study was to understand the complex situation of teachers' understanding of digital literacy integration as revealed during their collaborative professional development planning sessions while they designed their PBL unit. Even though in the ICS project and my study technology was a shared focus, we examined different angles. The ICS grant was an intervention and focused on the efficacy of an integrated computer science curriculum for grades 3-5 designed to increase capacity and affinity for computer science. My focus was to interpret and understand the teachers' perspectives about technology. My responsibilities as a GRA in the grant included conducting observations, attending leadership meetings, and assisting the postdoctoral researcher with research and dissemination. Dr. Dooley, the grant's Principal Investigator and Dr. Welch, a Co-Investigator, assumed the responsibility for the ICS grant. In

contrast, I assumed total responsibility for my research study. To further ensure a clear delineation between the ICS grant and my study, I did not share my data or talk about my study with ICS personnel.

Trustworthiness

Issues of validity and reliability must be carefully addressed in the qualitative paradigm (Creswell, 2007). While I have already touched on aspects of validity and reliability, in this section I outline in more detail specific steps I took to ensure the validity and reliability and hence, the rigor of this study. Scholars maintain an ongoing focus on what makes good qualitative research and the complex nature of qualitative methodology (Tracy, 2010). Several scholars have identified common procedures for establishing validity in qualitative studies. I used Tracy's Eight "Big Tent" criteria (2010); many of the criteria from other scholars overlap with Tracy's. These key criteria include: *worthy topic, rich rigor, sincerity, credibility, resonance, significant contribution, ethics, and meaningful coherences*.

Worthy topic. Tracy (2010) states that a good qualitative study should be relevant, timely, significant, and interesting. According to Tracy (2010) a worthy topic emerges not only from disciplinary priorities and interests but also from various political, social, and cultural situations. My topic rests on its significance; many New Literacy scholars assert the importance of being literate in the 21st century and the importance of being able to participate in a digital society across print and multimodal texts. Adding to the importance of my topic, research suggests many teachers a lack sufficient understanding of how to conceptualize and integrate technology into instruction (Leu at al., 2015).

Rich rigor. Tracy (2010) argues that rich rigor represents the criterion of quality qualitative research. She defines rich rigor as constructing a theoretical framework and aligning

it with all aspects of the study design and analysis, such as the methodological and analytical procedures (Tracy, 2010). My interpretivist perspective required exploring diverse perspectives and interpretations throughout the study. My use of constant comparative methods aligns with my interpretivist theory. My use of qualitative data analysis procedures is in line with my use of a sociocultural theoretical perspective. Further, my interpretation and discussion of the results were guided by my theoretical frame as well as the extant research.

Sincerity. Tracy (2010) defines sincerity as designing and conducting the study with honesty and transparency. Similarly, Merriam (2009) defines reflexivity as the identification of a researcher's bias, dispositions and assumptions regarding the research to be undertake (2009). Sincerity and reflexivity were achieved by being transparent throughout the study about the decisions I made and the reasons that led to those decisions by recording those decisions and reasons in my researcher notebook. In addition, I acknowledged my views and biases within the study report. This will allow readers to be aware of my positions. Finally, I consulted with one of my doctoral colleagues, a process known as peer debriefing. Miles and Huberman (1994) suggest, "Show your field notes to a colleague. Another researcher is often much quicker to see where and how you are being misled or co-opted" (p. 266). In addition, I met with my dissertation chair, Dr. Matthews. During my meetings with my peer debriefer and Dr. Matthews, I shared my thinking and analysis process and asked for recommendations for my future analysis.

Credibility. According to Tracy (2010) credibility refers to trustworthiness and plausibility of the research findings. Credibility includes a reader trusting the presentation of my data. I increased credibility by triangulating my data sources such as field notes, memos, and interviews. In addition, I provided thick descriptions of events (Lincoln & Guba, 1985).

Resonance. Tracy (2010) defines resonance as a research's ability to meaningfully echo and affect an audience and states that resonance can be achieved through transferability and naturalistic generalization. To achieve resonance, I do not make generalizations of the findings of this study to other settings or activities similar to those examined in my study. Rather, I offer thick descriptions of study events and thus allow readers to make their own interpretations of those events, (Stake &Trumbull, 1982).

Significance. Tracy (2010) identifies significance in terms of timeliness of the study as well as its ability to add to the current research, theories, or methodologies.

This study's significance comes from bringing clarity to how teachers collaboratively plan to integrate digital literacies in their project-based learning unit. By examining the teachers' perspectives and actions, I hoped to make their planning process visible and by doing so provide useful information that deepens understanding of how teachers collaboratively plan to integrate digital literacies within their project-based units (Tracy, 1995).

Meaningful coherence. Tracy (2010) states that meaningful coherency is the alignment between researcher's theoretical stance and the study's purpose and methodology. According to Tracy (2010) meaningful coherent studies are achieved by stating the study's purpose, by accomplishing that purpose, and by using methods and methodologies that align with the researcher's theories. In addition, the study is designed with findings from the professional literature in mind. In this study, the purpose and design of my study aligned with the tenets of my theoretical framework, the methods used, and my interpretations.

Ethical Considerations

According to Tracy (2010) ethics includes acknowledging and protecting participants' rights and ensuring their privacy and confidentiality. To ensure I conducted my study ethically, I

established and maintained a shared and respectful relationship with my participants (Denzin & Lincoln, 2005). In addition, I incorporated procedures prior to, during, and after the study to ensure an ethical process. Prior to the study, I received permission to conduct the study from my University's Institutional Review Board (IRB) and the schools' leadership committee. Once I received approval, I followed the approved guidelines to consent each participant. This included explaining the study's procedures such as how much of their time would be involved, the duration of study, the expectations for their participation, and the activities they would perform. I also emphasized that their participation was voluntary and that they might withdraw from the study at any time. During data collection, I maintained the confidentiality of all data collected by storing the data on a firewall and password-protected computer. To maintain the confidentiality of the participants, I removed all identifying information and assigned a pseudonym for each participant prior to final data analysis. Also, after I uploaded any audio data to a computer, I deleted the data on the tapes. Throughout the study, I reminded the participants to not discuss the study with school leaders, other teachers, or others in the school, associates of BIE, or members of the ICS grant team. After I completed data collection, I protected my participant's privacy by using their pseudonyms in my writings. Furthermore, I will maintain the participants' privacy by using their pseudonyms in any written reports or presentations. Given my role in the ICS grant, I did not share any information gathered during the study with any ICS personnel. The ICS personnel as well as the study participants and any interested party will have access to the public copy I submit to Georgia State University.

4 RESULTS

Chapter 4 presents the findings of this study. The purpose of this single case study was to examine the multifaceted situation of teacher's understanding of digital literacy integration as revealed during their collaborative professional development planning sessions while designing their PBL unit. This was a qualitative single case study which was intentionally chosen to help answer my research questions and contribute to the body of research on collaborative planning and technology integration. Case studies are an "in-depth description and analysis of a bounded system" (Merriam, 2009, p.40). The planning sessions and the teachers involved in those sessions can be thought of as a bounded system, or a single case. Case studies allow a researcher to examine a phenomenon within a real-life context. Yin (2008) explains, "A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (p.18). The sociocultural theoretical framework that informed my study also points to the importance of context. However, not much is known about this particular system. The dearth of research regarding teachers' planning and understanding of technology integration within school contexts made a qualitative case study most appropriate. This approach enabled me to go inside this teacher community (Little, 2003) to garner an in-depth examination of the teachers' understanding of collaborative planning and technology integration. Given that most of the existing research relied upon self-report data, I expanded my research methods to include observations and interviews to gain a more in-depth examination of teachers' collaborative planning and technology integration. Especially, the case was designed to address the following questions.

1. How can elementary teachers planning be described?

2. How do elementary teachers interact in their planning sessions?
3. What understanding of digital literacy is implied in how the teachers integrated technology in their planning sessions?

This single case study took place during the 2016-2017 school year at Parker Academy (pseudonym), a STEAM-focused charter school. STEAM is an educational approach to learning which uses Science, Technology, Engineering, the Arts, and Mathematics as access points for guiding student inquiry, dialogue, and critical thinking. In January, 2017, I recruited and consented the third-grade teachers to be my research participants. Data collection began January 11, 2017 and ended April 26, 2017. Data analysis began with the inception of the study and continued until I believed I had a clear understanding of the answers to my research questions. Generally, data analysis progressed via two-cycles. Initial coding involved using methods, for example, open coding and axial coding, aligned with constant comparative analysis. The process of initial coding allowed me to break down the data into meaningful parts, which enabled me to closely examine and compare those parts for similarities and differences (Saldana, 2016; Strauss & Corbin, 1998). Then, the second cycle of data analysis, axial coding process allowed me to reorganize the data set, collapse similar codes, and cross out redundant codes (Saldana, 2016). The main interpretation of the data came from looking at the parts and then relating them back to the whole. Additionally, continuous application of constant comparative methods allowed research findings to emerge from the frequent or significant themes in the data. I then examined these major themes for redundancy and then collapsed them into three major themes which I present in this chapter.

Brief Description of the Participants

Five third-grade teachers participated in the study, all members of the third-grade planning team. Two teachers taught math and science; two teachers taught social studies and language arts and one teacher was an IEP (Individualized Education Program) teacher. Table 4 presents relevant characteristics of the teacher-participants. Pseudonyms are used for participants.

Table 4 Teacher-Participant Information

Pseudonym	Years' Experience	Age Range	Experience with PBL	Race	Reported Stance Toward Technology
Kate	6	25-30	Core	White	Important
Tiffany	4	25-30	Experienced	African-American	Very Important
Stacey	3	25-30	Novice	African-American	Important
Kayla	2	21-25	Novice	African-American	Depends on When to use
Jennifer	1	21-25	Novice	White	Cant Live Without it

All five participants attended all planning sessions at which I collected data. I include in this section, brief profiles of each participant. Given the sociocultural and situative (Borko, 2004) frames that guided this study, such information is crucial to contextualize fully the findings. All members of the third-grade team are females with teaching experience ranging from two to six years, with 3.2 years being the group average. When Parker Academy became a PBL school, they created a PBL core team which provides guidance and support to the other teachers in the school in their understanding of the PBL process and guidelines. This core team encompassed six teachers across different grade level. All members of the Core team attended

one week of PBL training before the beginning of the school year. Responsibilities of teachers on the core team includes but not limited to: supporting teachers across all grade levels in the understanding of PBL guidelines, assessments and implementation of projects, helping teachers to oversee the projects, assisting grade level teams with refining PBL projects' driving questions, and helping to coordinate school-wide PBL meetings such as Half Hero days, when the third-grade teachers came together to work and plan collaboratively. I gathered the details included in the descriptions from the field notes recorded during the planning session observations and participant interviews.

Kate is a white female in her late 20's. She had taught at Parker Academy for six years, the longest of any of the teacher participants. Prior to teaching third grade, she taught kindergarten for five years. Thus, this was her first year teaching third-grade. The school departmentalizes teaching at each grade level, and Kate teaches Math and Science. She usually partnered with Jennifer who taught Math and Science as well. Kate was selected as one of the six core PBL teachers. As a core PBL teacher, Kate had a structured approach to planning during planning sessions. During the planning sessions, Kate wanted to make sure the project and activities were recorded on the team's PBL calendar, i.e., the calendar they constructed during their planning sessions that detailed days and times specific PBL activities occurred. She appeared comfortable sharing her ideas and was one of the teachers who took the lead in orchestrating the planning sessions. Kate spoke about technology during her interview, "So, how I did it this year [with technology] was kind of interesting because I'm new to the 3rd grade, and I'm new to the whole one-on-one technology. So, I was kind of learning with the kids." As a core

PBL teacher, Kate regularly looked for opportunities to build her own and her students' technology skills.

Tiffany is an African-American female in her late 20's. She had taught at Parker Academy for four years since the start of her teaching career, and this was her fourth year teaching third-grade. Tiffany serves as the third-grade IEP teachers. As the IEP teacher, she worked with students from all four third-grade classrooms. Tiffany was an experienced PBL teacher. Although she was not one of the core PBL teachers, she was the most knowledgeable teacher with project-based learning process among third-grade teachers. During her interview, Tiffany indicated that, "this year with planning PBL, to me it's very similar to how we plan any way. It's just making sure that we use that [PBL] language and incorporate what PBL calls for when we're planning," As implied in her statement, Tiffany was very familiar with PBL language and guidelines. Tiffany at the beginning of the year began a doctorate program at a nearby university. Although as an IEP teacher she was not required to attend the planning sessions, she continued to work and plan with third-grade teachers. During the planning sessions, Tiffany often took the lead in seeking opportunities to build the students' technology skills and their integration of technology into their instruction. Although she was interested in using technology, she listened to the other third grade teachers' ideas. She also was one who when the conversations became lengthy or veered off course would get the teachers back on track.

Jennifer is a white female in her mid 20's. This was her first year at Parker Academy and her first-year teaching. In fact, she performed her student teaching field experience at Parker Academy. Jennifer, thus, was a newcomer to the group. She taught Science and Math and partnered with Kate who also taught Science and Math. Jennifer was a novice PBL teacher. During the planning sessions, Jennifer was the most talkative member of the team. She was

comfortable thinking aloud and eagerly shared her ideas during the planning sessions. Often her talk became lengthy and diverged from the topic of conversation. Jennifer did not have experience with the ICS grant, design-based thinking, or the PBL approach. During the planning sessions, Jennifer was often the first teacher to focus on integrating technology. She spoke about her comfort with technology during her interview. She described herself as a digital builder and explained that, "I grew up in the 90s. You know where everybody in school [is] learning design. I've learned HTML when I was nine, and they [students] don't do that. But they have such a different understanding of what it means to be a digital citizen and what it means to understand you know media that is shared. They're much more comfortable. They're native whereas that [technology] was something I was taught and maybe I was taught a little bit more explicitly, and I was taught more of the background that there are the citizens maybe I'm the builder, but they are the citizen."

Stacey is an African-American female in her late 20's. She had taught for two years. This was her first year at Parker Academy. Before coming to Parker Academy, she worked at another Charter school. She taught social studies and ELA and mostly partnered with Kayla, who also taught social studies and ELA. Stacey was a novice PBL teacher. Stacey was quiet during the planning sessions, in fact she was one of the participants with the fewest utterances. She acknowledged this during her interview, when she said, "I feel like there were several times where I sat back and let others have the floor. And they had good ideas and that was OK with me … taking a back seat." In fact, her lack of participation during the planning sessions at the beginning made it difficult for me to see her perspective on collaborative planning and technology integration. However, towards the end of my data collection, she appeared to become more comfortable with sharing her ideas in the group. In contrast, Stacey was very open during

her interview. While she had questions about the process and the purpose of PBL, she integrated technology specifically Tumblr books into her planning and instruction.

Kayla is an African-American female in her mid 20's. She was in her third year of teaching and her first-year teaching at Parker Academy. Prior to coming to Parker Academy, she taught at another public school. Kayla taught social studies and ELA and partnered with Stacey who also taught social studies and ELA. Kayla was a novice PBL teacher. Like Stacey, Kayla during the planning sessions was quieter than Tiffany, Jennifer, and Kate. She rarely contributed to the discussions. During the interview, Kayla identified that time spent preparing the students for district level assessments was an obstacle to integrating technology and implementing the PBL unit. She said "cause they are making products for Market Day and make sure they had a digital component but at the same token, I know that I am trying to make sure they know how to read …, but I have to go back and also teach social studies. But the reality [is] they have to pass the Georgia milestones reading portion in order to go to 4th grade. So …some days I have to put aside [Tech integration & PBL activities] and zone into reading. It was kinda difficult." This response reflects Kayla's frustration with obstacles resulting from testing demands to integrating technology and implementing the PBL.

The preceding teacher participant descriptions are intended for the reader to recognize the individuality of each teacher as well as to offer context for the discussion of the findings. As a group, the third-grade teachers varied in the number of years they had taught, possessed different degrees of knowledge about PBL, varied in their experience with the ICS grant, and possessed different perspectives about technology integration. These variations in teachers' experience, knowledge, and perspectives contributed to my understanding of the complex situation of collaborative planning. The findings presented next reflect that complexity.

Thematic Findings

Data analysis revealed three dominant themes: planning: a dynamic and nonlinear process, technology integration, and constraints: roadblocks. Table 5 provides a visual reference to matching themes with the research questions.

Table 5 Research Questions with Matching Themes

Research Questions	Planning	Technology Integration	Constraints
How can elementary teachers planning be described?	✔	✔	
How do elementary teachers interact in their planning sessions?	✔		✔
What understanding of digital literacy is implied in how the teachers integrate in their planning sessions?		✔	✔

Table 6 provides a visual reference to the three themes and sub-themes.

Table 6 Themes

Themes
Planning: A Dynamic and Nonlinear Process
Planning: Internal and External Factors
Internal Factors
Mental Planning
Preparation
Teacher Experience
External Factors
Student Perspective
Assessment/Standards
PBL
Administration
Planning: A Multitude of Expressions
Collaborative Planning
Individual Planning
Pair Planning
Change in Planning
Technology Integration: Collaborative Exploration
Teacher Instruction
Differentiation
Conceptualization of Technology Integration
Definition: Digital Literacy
Constraints: Roadblocks
Infrastructure
Lack of Time
Personality Difference
Lack of Shared Knowledge

Planning: A Dynamic and Nonlinear Process

> In all teacher groups we observed, there existed what we characterize as an endemic tension between "figuring things out" and "getting things done" (Horn & Little, 2010, p.208)

Teacher planning sessions are a "thing" that creates time and space for learning opportunities to emerge. Planning is a non-linear, dynamic process which includes several components and factors that influence teacher decision making and their thinking processes (Kimmel, 2012; Wolcott, 1994). I looked across the corpus of data to eliminate the planning that occurred in the third-grade teachers' planning sessions. That analysis revealed that the teachers' planning was a dynamic and nonlinear process. This major theme, Planning: A Dynamic and Nonlinear Process, has three sub-codes with eleven child-codes. These sub-codes are: internal and external factors of planning, a multitude of expressions of planning and change in planning. Figure 2 provides a visual reference to the three sub-codes within the theme Planning.

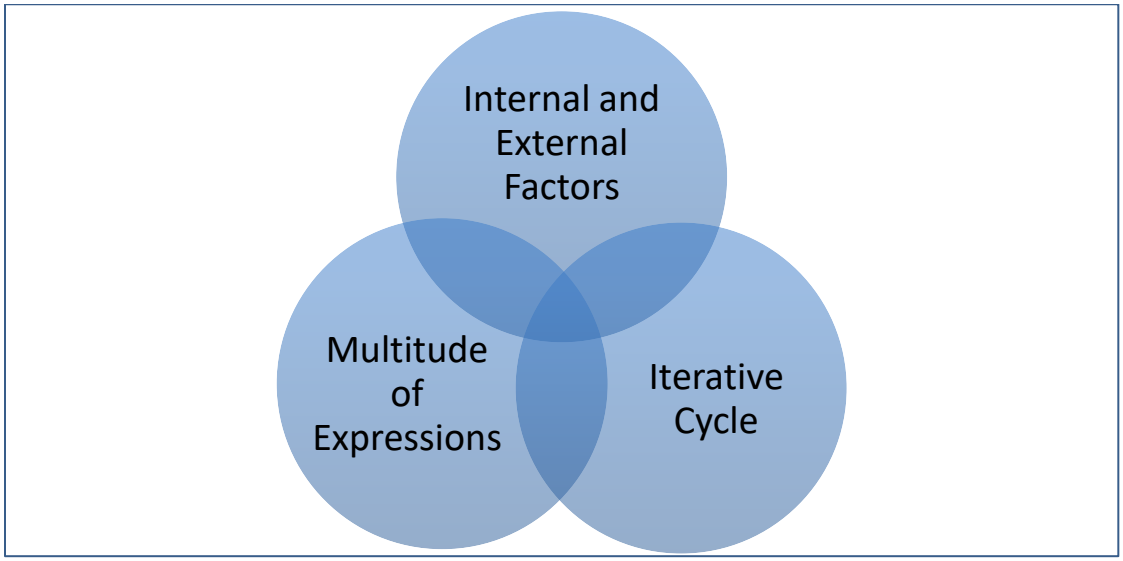

Figure 2 Third-Grade Team Planning Process

Planning: Internal and External Factors

The first sub-code, *internal* and *external factors*, has the most child-codes. I organized these child-codes within two categories: internal factors and external factors code. Internal factors I defined as: what teachers brought to the planning sessions, their *mental planning*, their individual *preparation and* their *teaching experience*. External factors I defined as factors outside of the teachers that influenced the planning process and included *student perspective, assessment/ standards, administration, and PBL*. In the following sections, I present the theme of the teachers' planning process in detail. Figure 2 provides a visual reference of the internal and external factors that influenced the planning process of the third-grade team at Parker Academy.

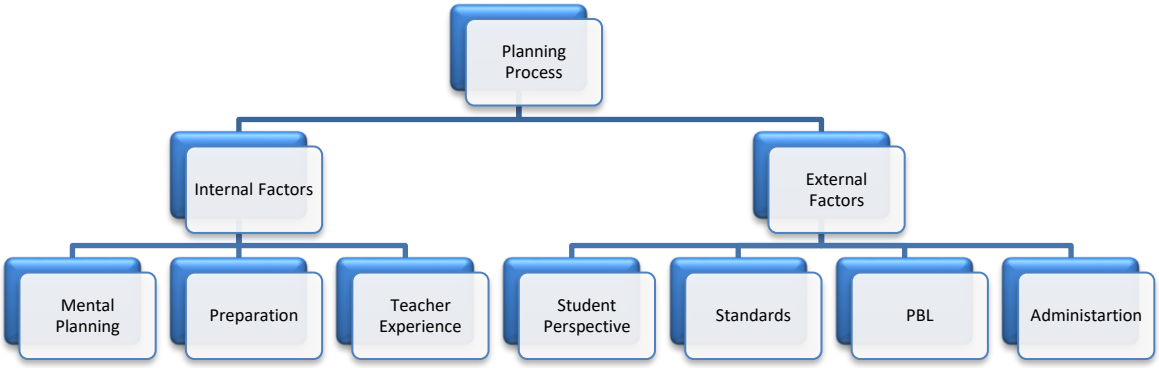

Figure 3 Planning: Internal and External Factors

Internal Factors The factors operating within the teachers that influenced their planning were *mental planning,* teachers' thinking and decisions, *preparation,* self-teaching if needed, *teacher experience,* teachers' background, what they bring to their instruction and planning.

Mental Planning. Mental planning includes the teachers' expressions of their thinking, their judgments, and their instructional decisions. During mental planning, the third-grade teachers mentally rehearsed the project's implementation to consider the best ways to teach, to refine the project, and to anticipate problems. While these aspects of mental planning were nested within the weekly planning sessions, they mainly took place at the beginning of planning the project. To illustrate, Jennifer talked about the team's rehearsal process. She alluded to the third-grade team mentally reviewing the proposed instruction days before their teaching began. She indicated: Many of the teachers' expressions identified as mental planning begin with, "I think."

> You know making sure that they [students] understood …took a little bit of finesse in going back or going ahead a week to [make] … updates to your plans. And so, while we did do a lot of upfront thinking, we also did a lot of week to week or even day to day [thinking] depending on how something went or just, you know, your typical school [interruption] you know it rains [so] we couldn't go outside [like] yesterday to do our project. So, we needed to stay inside and come up with something else (April 20, 2017).

As seen in Jennifer's excerpt, teachers went into detail when they mentally planned. Jennifer called it "upfront thinking" and related to how their days and weeks would proceed when they implemented the project in their classrooms. She also pointed out that teachers had to plan additionally for unexpected interruptions, such as if it rained and they could not go outside to do a project activity, they needed an alternative, they needed to "come up with something else" to

fill that instructional time. This type of upfront thinking and planning will likely contribute to effective classroom instruction.

Furthermore, the teachers' mental planning process often accompanied the teachers reflecting on their instruction. For example, during the planning sessions, teachers looked back and discussed "how things went." During this process, the teachers reflected on the decisions they made as a team such as purposes of the activities, the interruptions that occurred in the flow of activities, the need to ensure students' voice and choice, and the availability of materials. To illustrate, Kayla reflected on how to start and proceed with the project. She said:

> I'm like, all right well. How do I do? How do I convince them? How [do I] explain to them what they need to do or what they were trying to do, [for example to] put a picture into some kind of document like in a table…I would do that myself. And I would never consider that it's something they don't know. You know because our skill sets are different. And my purposes are different [from the other teachers]. So, I have to think about if I were going to learn this for the first time what would that be like? And think about how I would teach it? (April 20, 2017)

Kayla's mental thinking includes several "How to questions," How [do I] explain to them what they need to do or what they were trying to do? How do I convince them? In addition to wondering how she might perform certain instructional tasks, Kayla thought about how her students would experience the instruction as suggested in her statement. "If I were going to learn this for the first time what would that be like." Besides upfront thinking, these types of questions helped Kayla to rehearse her instruction in the near future such as the next day so she is clearer about her instruction and demonstrates her commitment to ensuring she is prepared when she presents the lessons.

The teachers' mental planning also was revealed in their discussions. Teachers spent time thinking and refining the projects' driving questions and instructional goals. They thought out loud while they brainstormed the project's key points. For example, at the first Half Hero day, an event when the third-grade teachers came together to work and plan collaboratively, the teachers mentally scripted the project's entering point. For instance, Stacey, Tiffany, Jennifer and Kate had a conservation about how to start the project:

> Stacey: I think we need to start next week to give them a scenario so that they can start building on it. We are starting producers and consumers.
>
> Tiffany: What if we each encourage them to brainstorm?
>
> Jennifer: It's going to be hard.
>
> Kate: Then, you need to reframe the driving question (January 11, 2017).

As illustrated in this excerpt, each of the teachers shared her opinion with the others about the project. Stacey and Tiffany shared their views about how to start the project and Jennifer and Kate shared their opinions about their team mates' suggestions, "It's going to be hard, "and they would need "to reframe the driving question." These types of conversations helped teachers to be on the same page. Additionally, these conversations illustrated Lave and Wenger's (1991) construct of a community having a shared purpose.

Mental planning involved the teachers making statements or asking questions to clarify aspects of the project. For example, during one of the weekly planning sessions, Tiffany and Kayla conversed about the scope of the project.

> Tiffany: I think we are trying to find a way to incorporate [the concept of] heat into the project without telling them they must use heat.
>
> Kayla: I think what we are trying is to make sure it is an inquiry-based project.

> Stacey: How can we manipulate natural resources to benefit our communities? (January 12, 2017).

In this excerpt, Tiffany and Kayla share statements that appear to clarify what they are "trying" to do" in the project. And, Stacey posed a question about the project. "How can we manipulate natural resources to benefit our communities?" As shown in this except, teachers discussed their understanding of the purpose of this project. This is another illustration of Lave and Wenger's (1991) construct of a community having shared purpose.

When the teachers engaged in mental planning, they shared their perspective, negotiated with their colleagues, and tried to understand each other's viewpoints about the PBL project implementation and technology integration. In other words, this rehearsal process provided opportunities for the third-grade team to be on the same page about the project.

Preparation. For this third-grade team, preparation encompassed teachers' checking the availability of resources, teaching themselves the content before instruction, and preparing the materials for instruction. Mental planning and preparation went hand-in-hand during planning sessions with preparation primarily taking place after mental planning.

Once the teachers agreed on the activities, they prepared by reviewing relevant websites prior to instruction and preparing activity materials and/or online resources. Most of the time, the third-grade teachers mentioned preparing for an activity that they had never implemented before. For instance, Tiffany explained that:

> Especially, if it's a Web site that I have never been on before. I always go and check myself. I'll see if there are any words that might be too big for my students to read. Yeah especially when I do web quest because web quest is [involves] majority reading where you have to go and actually read to find the information. So, I always go through myself

> first and scan to make sure we're ok or I google myself to see what are some kid friendly websites related to whatever [the] topic [is] (April 25, 2017).

As stated by Tiffany, online preparation is when the teachers "go through and scan" to make sure that a website is okay for them to use during instruction. She indicates that she checks for the presence of "too big words for her students to read." In other words, she scans the websites to ensure her students will not be challenged by unknown words so that the students will be able to easily comprehend the content information on the websites.

Similarly, preparation included the teachers checking the proposed materials ahead of time so that they became familiar with the content to be taught. During the planning sessions, Kayla stated that:

> Yeah, I do teach myself a source [content] so I'm familiar for this. If my students have questions, I can assist them (February 9, 2017).

As seen in Kayla's except, self-teaching is important to her; she wants to become comfortable with the content so that she will be able to answer her students' questions. Preparation also included finding the right teaching resources for the planned instruction. During her interview Kate said:

> I also try to look for things that had some the research stuff, some fun components. Maybe a game they can play, you know Brainpop's [is] always good for that. They can watch a video; after that they can play the game, or they can do the vocabulary flash cards, that sort of stuff (April 25, 2017).

For Kate, preparation includes finding resources that will push her students thinking as well as make learning enjoyable for them. She also points out the importance of choosing activities that will engage her students. To that end, Kate's preparation includes finding a website that offer a

game the students can play after the instruction of the content. Student engagement and catching students interest were very important components in classroom instruction for the third-grade team.

Teacher Experience. For the third-grade team, their experience included previous PBL teaching and knowledge of the PBL model. The teachers' teaching experience and PBL knowledge were revealed in teacher conversations during planning sessions. The third-grade teachers mutually engaged in planning sessions and they had a discussion routine which began with stating an opinion; providing reasons, explanations, and justifications for their opinions. During the teachers' planning discussions, these explanations and justifications stemmed from their teaching experience and their PBL knowledge.

In a similar vein, Kate and Tiffany's experience with teaching within a PBL model, positioned them as experts. This experience included grasping the PBL vision and perspective. They reflected on their past experiences with PBL and shared their ideas about activities suggested by other teachers in the group. For instance, in this excerpt, Kate ties her rationale for her thinking to PBL.

Kate steps in and asks for an overview of each project.

Kate: What's the main standard?

Tiffany: Social studies and economic standards.

Jennifer: And science- Heat standard, transfer heat energy- melting, fraction. One of the products has to involve heat. They are using heat for their products.

Kate: I think a scenario will be good. What factors are involved for success in business? What makes success?

Jennifer: We are talking about resources, natural resources.

Kate: Giving them a situation without telling them what to do. I am talking about putting them into the situation. If you give them a context, they can come up with something. I need to put heat into the context.

Stacey: I think we need to start next week to give them scenario, so that they can start building on it. We are starting producers and consumers.

Tiffany: What if we each encourage them to brainstorm?

Jennifer: It is going to be hard.

Kate: Then you need to reframe the driving question.

All the other teachers agreed and nodded their heads (January 11, 2017)

This short conversation demonstrates the richness of the teachers' interactions and evidence the rich opportunities their interactions provide for teacher learning. Kate's position as expert in PBL is illustrated in this except by her asking clarifying questions such as "What factors involve in success and business? What makes success?" and by offering clear statements about the main purpose of the project. Similarly, Tiffany references the project's framework by clearly stating the project's major content standards. She states that the project's main standards are from social studies and economics. Kate and Tiffany's position as experts is evident when they share ideas from a PBL standpoint, such as stating the importance of the learning process over the final product, knowing what would work or not in their classrooms, and redirecting side conversations back to project planning. This brief conversation demonstrates that as teachers clarified the project's main purpose, they were also sharing different types of expertise. For example, Jennifer shared her expertise when she shared information in science about the transfer heat energy and for social studies economics.

In a similar vein, Tiffany positioned herself as an expert by reflecting on her previous PBL experiences. Levine and Marcus (2010) suggest that replays, what they did in class, offer opportunities to learn because "teachers make their own specific teaching available for colleagues' learning and critical scrutiny" (p.393). During one of the beginning planning sessions, Tiffany talked about the importance of emphasizing process over product. For example, in this excerpt, Tiffany emphasized that "process" is the main focus rather than "product" in PBL approach. She said:

> And, I try not to because I'm, you know, I've done this project for a while. I try not to make it seem like it has to be done in a [certain] way. However, they [other team members] don't need to melt [only focus] into the product, if we teach them instructional strategies they will get to the final product. The product may come or not but the process will [and it is important] (January 13, 2017).

In this excerpt, Tiffany's comments suggest that she draws upon her past experience using a PBL approach. In her interview, she shared that she "didn't try to make it seem like the project has to be done a specific way" but she reminded the other team members of the need to focus on the learning process rather than the final product.

In addition to acknowledging her experience with PBL, Kate made references to the minimal experience of the new teachers on the team. During her interview, Kate stated:

> There are a lot of new people on our team so they'll come in with great ideas. And you don't want to shut down their ideas but logically as someone who has taught for a while, you know that they're not feasible ideas, but they are a lot of times [you] don't want to hear that. So, you know it's all those things that go into team planning especially with people on different pages and different levels (April 25, 2017).

As seen in Kate's excerpt, she mentions that the new teachers might not offer practical or reasonable ideas. She reflects on the "feasibility of ideas" while implementing a PBL approach. She points out that having experience in teaching and in implementing the PBL approach helps teachers foresee how to proceed and plan using this framework. Interactions such as these in which the teachers share resources and expertise, highlight the value of collaboration within the community.

On the other hand, Kayla and Stacey, who were both novices with no prior experience with a PBL perspective and new to the third-grade team, mentioned that there were times they did not share their thoughts or ideas during the planning sessions. Stacey's comment illustrates how she positioned herself as a new teacher and accepted the more experienced teachers' ideas. Stacey points out this willingness to, "take the back seat."

> There were certainly times where I think that's something that you have to do, at times, in order to collaborate with others as a new teacher. Sometimes, you have to sit back and let other people have the floor. And I feel like there were several times where I sat back and let others have the floor. And they had good ideas and that was OK with me it was OK to take a back seat and help to play some of the minor details from the big details (April 25, 2017).

In this excerpt, Stacey shares that "there were several times where [she would] sit back and let others have the floor." And that she was okay with "taking a back seat" because she was new to the third-grade team and PBL. She also indicates that accepting other members' ideas is essential when collaborating with others. Additionally, she mentions that often she likes the other teachers' ideas and agrees with their suggestions.

From the teachers' comments, it is clear that the internal factors of teacher experience shaped the conversation during planning sessions. The teachers with more PBL knowledge and experience shared and participated more often in the discussions than the new teachers. The discussions also illustrate Lave and Wenger's (1991) construct of legitimate peripheral participation where old timers, i.e., the experienced teachers, provide new timers, "new teachers" an authentic context in which they can learn.

External factors also influenced the teachers' interactions ? during the planning discussions. External factors I define as factors outside of the teachers that influenced the planning process and includes: student perspective, assessment/ standards, administration, and PBL. I detail them next.

Student Perspective. Ensuring they accounted for their students' perspective was at the heart of the teachers' planning. Each meeting included multiple instances when teachers discussed the differences and the needs of their students and indicated their desire to ensure student engagement. The third-grade teachers highlighted the need to consider (a) their students' instructional needs and levels, (b) the importance of their students' voice, and (c) the need to provide choice in the activities they would perform. Engagement could also be accomplished by relating classroom activities to students' interest. For instance, in the following excerpt from one of the planning sessions, Jennifer and Kayla talk about the importance to consider their students' interests:

> Kayla: Should we prefer to use videos?
>
> Jennifer: Well, it depends on the lesson. Alternate means- to get information-instead of standing there and talking to them all day [which] tends to bore them. So, switching [from stand alone to alternative teaching] time to time helps to get them engaged. And

> also giving the information in an alternative format. Kids love cartoons. In the cartoon scenario, they get to learn how to use proper fractions. It gives a lot of context for why this is relevant for them. Why they might care to know this, and it was more tangible for them (March 9, 2017).

Similarly, student engagement was another focus of the teachers during planning. Teacher decisions were based on the actions and behaviors of the students. When planning a shared activity, teachers spent time revising according to students' choice and interests. Kate's comments illustrate.

> A lot of kids hate fractions. They find it boring, tedious, and hard to make them see. So, we did smores for science. It was not a part of the assignment, but they realized that they had to break the graham cracker into fractions, break the Hershey's bar into fractions. And it was a good way to see that. So, when I go to find materials, choosing materials that will keep them interested and engage them. The more boring the content I try to make it more engaging (March 9, 2017).

Despite feeling the need to cover content standards with fidelity, teachers as demonstrated in Kate's comments, find ways to modify their instruction based on what they believe would support student learning and engagement.

Student perspective included not only student engagement and learning but also keeping students' differences and ability levels in mind as they planned. To meet student differences, teachers also adjusted in their planning. Stacey's comment demonstrates this interest.

> But one thing that I would notice that we would do a lot of planning, [and I think] my block one [group] is gonna struggle with that. You know, and so we would make

> adjustments. So we could have some flexibility; that's just already built in so that if you need to tweak something (April 20, 2017).

Standards and Assessment. Data analysis revealed that another external factor was the need to cover the state's curriculum standards. For these teachers, this was the most important consideration in the teachers' planning decisions. Most of the planning conversations started and/or ended with the need to teach the standards. All teachers possessed a strong understanding of the standards and the need to connect standards to the project's implementation. Time to time, the teachers needed to reconcile the tension between standards/assessments and the teaching within PBL framework. The tension mainly stemmed from the lack of understanding of integrated PBL perspective. Teachers perceived standards and assessments separate from their projects, as checkpoints that they need to hit and make sure students know. Rather PBL framework requires the teachers to think creatively about how to teach within an integrated instructional strategy to prepare students for deeper thinking while hitting these checkpoints. Stacey's comment reflects the group's belief in the need to begin their planning with an understanding of the relevant standards.

> There are certain things that we must hit and make sure that they have to know. So, we have to start with standards and once we understand standards, we can say [now] ok what will be engaging? what will be fun? (April 23 2017).

Not only does Stacy's comment state that, "we have to start with the standards," but that starting with the standards is a necessary step to moving to the next step, i.e., planning learning experiences that, "will be engaging" and "fun." In addition to the curriculum standards serving as a necessary first step in the teachers' instructional planning, the standards also provide the team

with a *road map* that keeps the teachers *on track.* Tiffany's comment, made during her interview, suggests the significant role standards play in the teachers' planning.

> For me, I just feel like making sure that we stick to the standards and that each element of the standards being taught is the biggest component of planning. Because, I think what PBL is, it can quickly get, huge. And, we know there are so many experiences that the kids get through the project-based learning. We are able to teach things than check off the standards.

From Tiffany's comment we learn why she believes the standards should serve as a road map. They must, Tiffany says, "stick to the standards," because "each element of the standards … is the biggest component of planning." Further, keeping their eye on the standards roadmap, so to speak, helps them to remember what the standards say they must teach because "PBL, can quickly get huge" causing them to veer off course.

Teacher discussions were shaped not only by the standards but also by the curriculum assessments they are required to give. Teachers spent a lot of time planning how to assess the students' knowledge of the concepts taught. As Abrams et al., (2010) found in their study, these third-grade teachers felt pressure to cover required content knowledge by the state and raise test scores. Kate's comment reflects those of the group:

> What we wanted to know [what was happening] at certain points in time, so this calendar here was very helpful, and we started with blue one which would be their assessment pieces and what we wanted them to know by generally a certain date. And then, we kind of went and plugged in the work periods after that to make sure that there would be enough time logically for them to master that standard or that concept before we assessed them on it. And also, we wanted to be very intentional about making sure we taught those

> before they were assessed. So just making sure you know we had morning meetings or discussions shown in the rubrics before that day actually happened.

As seen in Kate's excerpt, the teachers' planning includes the need for students to master the standards and the need for them to assess their students' knowledge of the standard. She also points out that they try to make sure students have time to master the concepts before they are assessed.

Besides standards, a teacher-made PBL calendar served as another roadmap that kept the teachers planning on track. The calendar was poster size with large rectangular-shaped spaces, one space for each teaching day. The teachers used different colored Post It sticky notes, to represent student work periods, unit assessments, collaborative work periods, and high-standardized testing times. They placed one Post-it sticky note on the PBL calendar for each of these parts of the project. This visual helped the teachers to know when certain instructional events occurred as well as to make sure that students had the opportunity to master the concepts and standards before they assessed the students.

Figure 4 The Third Grade PBL Calendar

Additionally, the Post It sticky notes served a very practical purpose for the teachers; they could easily be moved when they needed to change the order of the activities or revise project events once they began project implementation. Kate talks about how they use the PBL calendar.

> And then we went to the blues [sticky-notes] which were the assessment pieces, and then we plugged in the pinks [sticky-notes] for work periods and then we went back with our greens [sticky- notes] because we noticed last time we had reduced access skills here assignment. And that was something that kind of got once started that got pushed to the side in terms of assessment. We would teach it and have lessons that we would forget to have students follow their rubrics on them [students] or even reflect back on it and have conversations with them [students]. So, we were very methodical about plugging those (April 25, 2017).

In this excerpt, Kate elaborates on how they use the calendar to plan the assessment periods. According to her work periods and assessment cycles are iterative and enables the teachers to

"reflect back" and revise the plan as needed. She also expresses that the calendar helps the teachers to examine the planning decisions while they reflect on the lessons and assessments. She emphasizes they are "very methodical" about where to place the assessment events on the calendar. From a PBL perspective, the teachers also used covering standards and assessment reciprocally. While placing the assessments on PBL calendar Kayla and Kate engaged in this short discussion:

> Kayla: We need to add work periods.
>
> Kate: The thing that I learned from the PBL lady, you should have pink before blue, because you teach first and then assess but it can be also interchangeable (February 9, 2017).

Kayla and Kate discuss the pattern of "teach first and then assess." The calendar provides flexibility for teachers during planning meetings. The calendar illustrates Lave and Wenger's (1991) construct of flexibility because it allows the teachers to make changes in their planning.

Administration. The school administrator was another external factor that influenced the teachers' PBL project planning. At the beginning of the school year, PBL was introduced to all teachers in the school. Each grade level was required to implement a project and to ensure the project covered the state curriculum standards. The Academic Director, Ms. Smith (pseudonym) was present during the Half Hero day and she joined several of the teachers' planning sessions. As a result, Ms. Smith was familiar with the third-grade's project and planning process.

Ms. Smith also closely monitored the third-grade team's planning and when present, she shared ideas and provided feedback. In addition, Ms. Smith had to approve the project's driving questions. Her approval was based on her determination that the driving questions aligned with the PBL vision and that they could be explored following PBL guidelines. Once, Ms. Smith

approved the project's driving questions, the teachers completed a resource request form, specifying materials they needed for the project. Once Ms. Smith approved the project's driving questions, her influence was less direct but evident in their instructional choices. For example, during the PBL planning sessions, the teachers prepared anchor charts which detailed strategies, cues and guidelines that they would use during project implementation. To illustrate, "R.A.C.E." was one of the anchor charts the teachers made during one of the planning sessions. R.A.C.E stands for R, restate the question, A answer the question, C cite the evidence, and E explain. After the planning sessions, Tiffany explained to me that these anchor charts should be up during instruction in case an administrator made a blitz visit.

Project-Based Learning (PBL). The PBL approach served as another external factor that influenced the team's planning process. The PBL approach required the integration of all content areas within the project while covering state standards. As stated in Chapter 3, I viewed PBL as a context in which the teachers worked during their planning and instructional time. In other words, rather than examining how the teachers planned their PBL unit, my main purpose was exploring how teacher interactions and collaboration took place in the PBL planning sessions. However, PBL was an external factor that influenced the teachers' planning. To illustrate the influence of the PBL approach, teachers spent time (a) matching the project content with curriculum standards, (b) making sure project content was engaging for students, and (c) using the PBL language as needed during the planning sessions. It is important to mention that the third-grade teachers' Promise Planning, upfront thinking, within a PBL approach took additional time. Upfront thinking and rehearsing during the PBL planning sessions involved more traditional ways of planning. Tiffany emphasized this iterative planning cycle of PBL during her interview.

> And a lot of the time we have to go back, which we do as teachers anyway, but because we do so much up front with PBL I feel like we spend more time planning this way than I do with just traditional methods of planning (April 25, 2017).

As Tiffany states when planning a PBL unit they need to go back and revise their planning. She adds that the PBL approach requires additional up-front planning which is different than a traditional way of planning. Similarly, right after one of the planning sessions, Stacey shares with the group that: "So with the planning process, I would say for some reason planning the PBL way seems to take more time" (February 9, 2017). While flexibility allows outside of traditional teaching practices (Lave & Wenger, 1991), it might also take additional time.

While planning within a PBL approach, teachers mentioned the importance of matching project content to state curriculum standards. During her interview, Kate states:

> I think definitely standards. Student voice and choices are important, but I think with PBL that's the part of the confusion and when it's not done as well that we lose focus of the standards. So there does need to be student voice and choice and we can incorporate that but at the same time we have to teach a certain thing and we need to make sure that's being taught (April 20, 2017).

In this excerpt, Kate comments on matching the project content with the "student voice and choices" and "focusing on the standards." She continues that "we have to teach certain things and we need to make sure that's being taught."

On the other hand, PBL provided opportunities for teachers to engage in deep discussions about teaching and learning. Teachers agreed that they had an opportunity to engage in deep discussions and to learn from each other. For instance, Tiffany during her interview, pointed out the importance of having "all voices" heard and present when planning within a PBL

perspective. She states: “That was very beneficial, just having the time to plan together because especially with these PBL projects if they are going to be truly integrated then you have to have all voices present” (April 25, 2017).

Additionally, PBL planning involved keeping the end goal in mind. Almost all of the teachers stated they had to work backwards from PBL’s end goal to ensure student learning was scaffolded from the project’s beginning and to ensure they framed the project around this end goal. During planning sessions, teachers finalized the project’s driving questions with the end goal in mind and came up with the activities that would enable the students to complete successfully the final product. Kayla’s comment reflects the group’s need to work backwards from the end goal:

> Because we were working backward with the end game in mind. We knew that our product will be Market Day. So, it is working backward. What is market day look like? What are the different components that we need for Market Day, and also as we were planning, we did go back and review anything that was not how it was supposed to be? (April 20, 2017)

As seen in Kayla’s excerpt, teachers when planning consider the completed project. During the planning and implementation of the project, she says they deliberate what Market day would look like. And, she adds they work on the required components for the project, and review and revise the plan if needed to complete the project. Working backwards from the end goal provides opportunities for the teachers to reflect on the instructional process (Parsons et al., 2010; Barron & Darling-Hammond, 2008).

To sum up, planning as enacted by this third-grade team was a dynamic and non-linear process with multiple points the teachers needed to consider. During the planning process, the

third-grade team had to consider the need for students to master state standards as well as their desire to create active and engaging learning opportunities for their students. These external factors created the dynamic nature of the teachers' planning. At times, teachers had to adopt and change their activities according to their students' interests or content standards. These changes made the planning process dynamic. Similarly, the planning process was non-linear. While guidelines exist when using a PBL approach, PBL does not have steps teachers must follow when planning a unit. As demonstrated in the words of the teachers presented in this section, the teachers were able to change the order of activities and assessments to meet student needs and to make needed adjustments in the project. This flexibility generated the non-linear sequence during the planning sessions.

Planning: A Multitude of Expressions

Planning for the teachers in this study was expressed in three ways: collaborative planning, pair planning, and individual planning. Each type of planning served a distinct purpose.

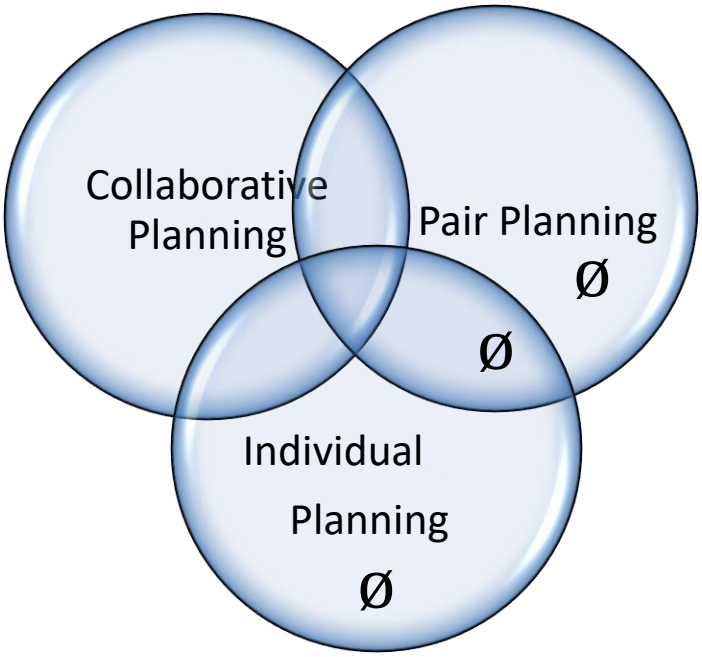

Figure 5 Multitude of Expressions of Teacher Planning

As seen in figure 4, the third-grade team had an interrelated planning interactions. While collaborative planning was the primary expression, there were times the teachers preferred pair and individual planning to accommodate their and their students' needs. Besides their weekly collaborative planning sessions, the third-grade teachers had additional pair planning times with their partner teachers when they had quick-ins and clarifications on their content instructions. At last, each member of the third-grade team mentioned that they also preferred individual planning times when they could teach or get familiar themselves the content before instruction. Individually planning times also fed collaborative and pair planning sessions. There were no teachers who only participated in pair planning or individual planning as depicted with the empty set symbol (ø) in the venn diagram. All five teachers attended weekly collaborative planning sessions. It is also worth noting that the uniqueness of the school context and population revealed itself in planning as requiring additional adaptations and modifications according to teachers' and students needs and interests. I elaborate on each expression in detail below.

Expression One: Collaborative Planning

Collaborative planning has two child-codes: nature of collaboration and sustaining a commitment to collaboration. The theoretical framework that guided this study conceptualized the teachers' planning sessions as teachers engaged in a community of practice where teachers negotiate the project's purpose and meaning, where teachers are offered opportunities to learn through discussions, and where teachers are engaged in pedagogical reasoning (Horn, 2005, 2007). Wenger (1998) defined a community of practice as a community bound through practice, in which practice serves to bring coherence to the community through mutual engagement, joint enterprise, and a shared repertoire of information, resources and experience (p. 73). I considered the third-grade team at Parker Academy as a community of practice as grounded in this definition. These teachers were bound by practice through their mutual engagement and joint enterprise of PBL planning for their third-grade students. They shared a common purpose that bound the third-grade team and provided a unifying goal for their actions. They also shared resources. For this team, shared resources included their students, because although each teacher was the teacher of record for a particular class, the students rotated to other third grade classrooms for math-science and language arts-social studies. These shared responsibilities and a shared purpose of planning a PBL unit which required them to interact regularly. With these ideas in mind, I looked across the data to understand how teacher engagement revealed itself in the third-grade teachers' planning sessions. Given that I considered the third-grade team at Parker Academy as a CoP to understand this community, it was important to unpack the relationships among and between the third-grade teachers. With this as background, collaborative planning has two child-codes, the nature of collaboration and a sustained commitment to collaboration.

The nature of collaborative planning is one of the child-codes under collaborative planning and encompasses being mutually engaged; having a common purpose; and sharing a repertoire of procedures, techniques, tools, and resources. As aforementioned, the grade-level team was mutually engaged due to shared responsibilities, continuous interactions, and their discussions in designing and implementing the PBL project. During the planning meetings, while these engagements did not result in the teachers agreeing about everything, all teachers believed they shared a common purpose in their joint enterprise of teaching to the best of their combined ability the third-grade students. Additionally, these teachers shared a repertoire of state curriculum standards and project materials. Looking across these features, sharing a common purpose and sharing a repertoire of procedures, techniques, tools, and resources this third-grade team created particular cultural norms integral to their planning process.

One of their important cultural norms was respect for and a willingness to engage in collaborative planning. Prior research on teacher communities indicates that for teacher communities to lead meaningful discussions around curriculum and instructional issues, there must exist a sense of respect among community members (Achinstein, 2002; Grossman et al., 2001; Louise et al., 1996). Such respect existed among the members of this third-grade team. Jennifer's comment illustrates these dimensions of collaboration.

> I'm going to be honest, I really don't. At least for my grade level team I don't see a huge downside. I mean even, I'm very fortunate to work with a team that works well together. I think everybody has kind of a different set of interests and a different set of skills, that when we put them together, we have a lot of resources to learn from (April 25, 2017).

As Jennifer states, each teacher brought to the team different interests and skills and combined created a lot of resources on which they can draw when planning and consequently when

teaching. Comments like Jennifer's suggest the teachers view their collaborative work as a rich "resource" to learn from each other. Different interests and skills among the teachers created resources they could use for teaching and personal learning.

Mainly, the teachers' collaborative engagement was the result of a shared sense of respect for each member's interests and skills. The third-grade team achieved this engagement by posing questions to explore different perspectives about project activity planning. The exploration of different perspectives related to how to introduce an activity, which digital tools to include, and which content to teach and assess. Engaging in conversations about their different perspectives developed into respecting each other's interests and skills. As Baylor and Ritchie (2002) assert, interacting and engaging in conversations and respecting each other's interests and skills facilitate teacher's openness to change.

Although Kate shares Jennifer's view of the importance of respecting each other's views and the benefits of collaboration in her interview, she speaks to how "tough [it is] to plan with five different people".

> Again, it's tough planning with five different people who have different opinions and different ideas. And different experience[sic] as well. But collaborative work is very beneficial, just having the time to plan together, because especially with these PBL projects, if they are going to be truly integrated then you have to have all voices present (April 25, 2017).

As seen in Kate's excerpt, she says that although "it's tough planning with five different people who have different opinions and different ideas And, different experience[sic] as well. But collaborative working was very beneficial" and that collaboration benefits with "all voices present" during the planning sessions.

As reflected in Kate and Jennifer's comments, they viewed the differences among their team members as useful and the need to "have all voices present" as central to the nature of their collaborative work. When viewed within the complex concept of legitimate peripheral participation (Lave & Wenger, 1991), no one person should have more "voice" than the others. By having all voices present, community members move toward more-intensive participation with all members becoming full-participants within the group.

As reflected in the appreciation of the different opinions and ideas present among the third-grade teachers, a culture of sharing existed within this community. Thus, for this third-grade team, collaborative planning included the teachers sharing resources, ideas, and experiences during the planning sessions and outside of the planning sessions. Such teacher sharing facilitated collaborative decision making and strengthened their commitment to follow through on those decisions.

Sharing ideas in the planning sessions created rich learning opportunities for the teachers. During the planning sessions, teachers provided each other feedback on how to introduce, implement, and assess the project activities; they pushed each other's thinking. They shared opinions of what would work and what would not work when teaching their respective groups. Kayla elaborates on the value of sharing ideas during planning.

> Collaborative planning is very beneficial, because things that don't work for me, may work for you, and you may already know how to answer the questions that I have. [For example] how to run centers. You may have an expert in your collaborative planning, [who says] like hey this is how I run my centers and this is how it should look or this is what works for me and this is what works for a talkative [student] group, cause you do have talkative groups, and you do have mellow groups (April 20, 2017).

Kayla, in this excerpt, communicates the benefits of sharing ideas for teaching. She states that sharing ideas and expertise about teaching within a collaborative planning are "very beneficial." She adds that sharing ideas helps teachers to see what might work or not work for their respective students. Sharing resources, therefore, broadened the individual teacher's repertoire of materials she could use in her classroom. Such sharing is important. For example, studies suggest that sharing resources reduces teachers' stress, which may increase job satisfaction and decrease feelings of burnout (Kilgore & Griffin, 1998; Cooley & Yovanoff, 1996). Stacey's comment appears to reference this benefit of sharing resources.

> We're definitely doing the same thing in the same week. It might not be the same day, but it is the same thing. And I think, I wanna say it's almost like a comfort. Because last year I didn't share plans with another person. [Such as if there is] Anything you're not sure what's the best way to do it. Are there other activities or things more entertaining? And Kayla always has like some great entertaining ideas, and I am like come on give me some ideas! (April 20, 2017).

As Stacey states, sharing ideas is comforting for the teachers; sharing provides examples of ways to teach which might be "more entertaining." And, "Kayla always has like some great entertaining ideas, and I am like, come on give me some ideas!"

Besides sharing ideas and resources during planning times, the third-grade teachers shared technology knowledge. Teachers shared their experience with specific technology applications. Group members' familiarity and facility with different technical tools allowed them to share those resources and provided ongoing support for each other. To illustrate, Jennifer remarks about the benefits of teachers sharing technical expertise.

> But Kayla knows all about it. And I think, going back to what we were talking about before, that's one of the ways of our collaboration [that] is very beneficial. You know not only are our students' digital learners, but we are too. We all have different sorts of technical ability that we can bring to the table (April 25, 2017).

Jennifer's comment, "we all have different sorts of technical ability that we can bring to the table" indicates she recognizes that not only students but also teachers are digital learners and can share technical expertise.

Combined, the sharing of resources, ideas, and technology expertise created a culture in which sharing was a norm within the third-grade team. The teachers viewed this culture of sharing as "like a comfort" and as beneficial to their instruction and supportive to the group's planning. The collaboration and sharing that occurred within this group of teachers enabled the teachers to present their voices during their planning sessions and as a consequence, enhanced their teaching.

Sustained commitment to collaboration was the second child code in collaborative planning. Wenger (1998) proposed that learning holds meaning in relation to the community and is constantly negotiated. According to Wenger (1998), the participation and reification duality is concerned with meaning. Such meaning is created through participation and active involvement in a practice. Participation refers to the active process of engaging within a community, while reification refers to a way for group members to remember and to connect with their shared history and purpose, a reification made tangible through their collaborative experience. Through the group members' participation in negotiating meaning around developing reifications, i.e., the participating teachers developing history, is where Wenger (1998) maintains that learning occurs.

Throughout the planning sessions, the third-grade team continually negotiated meaning regarding the implementation of the project. Continued discussions relied on the participants' willingness to share and reflect on their decisions and instructional practices including their instructional successes as well as setbacks. It falls to reason, that the members share a common purpose, a unifying goal that binds the members together.

The collaboration did not always occur naturally or easily. The teachers needed to spend time together before they were comfortable enough to share differences in teaching styles and to question each other's instructional practices. Jennifer's comment speaks about how time was an important element in sustaining the group's commitment to collaborate as a team when planning their PBL project. During her interview, Jennifer shares her thoughts about the process:

> I will say this project is much less stressful than our last project. I think it has a lot to do with, knowing each other better. I definitely felt in our last project like being all new to the team together and just kind of figuring out how we were going to go about the project. This project I'll say it flowed much more smoothly, and I think it's because we're much more comfortable with each other. We understand each other's teaching styles better, and we also kind of know, at this point OK you know what to do with that. (April 25, 2017)

In this excerpt, Jennifer recognizes that spending time together enables the teachers to get to know and understand each other. Sharing ideas as well as practices provides opportunities for the teachers to know each other better which results in easier collaboration when planning. And, as Jennifer asserts, knowing each other's teaching style made them "much more comfortable with each other."

On the other hand, during the planning process, the teachers acknowledged they each possessed different views about teaching which at times created tensions and disagreements. For instance, in this excerpt, Jennifer recalls that they would "butt heads" around certain decisions while planning.

> We were all new and Kate was new to third-grade. Kayla, Stacey, and myself were all new to the school in general. You know we're all coming in with different ideas, and we did kind of like butt heads about how we were going to do certain things but not in a negative way (April 25, 2017).

As seen in Jennifer's excerpt, not all engagements resulted in agreement during the planning meetings. While they did not resolve all disagreements, they resolved many using the strategy of the majority ruled. Kate elaborates:

> I 'm thinking of like two different situations where finally [we] had to kind of [decide] it had to be majority rule. And people on our team, we definitely have some people that [*sic*] don't change their minds. So, we would just say, OK this is what most of us think, and this is what we're going to go with (April, 25,2017).

Kate alludes to "we definitely have some people that [*sic*] don't change their minds." She said there were two occasions when the team could not come to an agreement and it had to follow the "majority rule" strategy to solve the disagreements. Invoking this strategy enabled the group to return to planning the project.

In addition, crosstalk was another strategy that sustained team members' commitment to collaboration. Oxford (2017) defines crosstalk as the transfer of "signals" between communication channels and casual conversation. Crosstalk often happened during the planning sessions and was evidenced when a conversation continued across multiple turns and when the

conversation involved multiple speakers. Evidence of crosstalk occurred throughout my planning field notes but was most numerous when the teachers shared their teaching practices, instructional ideas, teaching dilemmas, or when they were in the midst of airing differences of opinion. For instance, in this excerpt all five third-grade teachers discuss the logistics of the second grade Market day.

> Kate: How many books do we need? How many books did you guys use last year?
>
> Tiffany: We had 15 books.
>
> Jennifer: I have discovered that Dylan likes to cut out Hero books, this engages him and keep him focused.
>
> Tiffany: I am looking at the survey. When are we going to give it to second graders? During lunch time?
>
> Kayla: If you were given 10 hero bucks to buy an item, what would you buy?
>
> Kate: Are they going to pull all the students, and are they going to pull some of the kids?
>
> Stacey: I don't know.
>
> Tiffany: I am little confused.
>
> Stacey: So, my two representatives will go to class and the rest can demonstrate the data and create journey map.
>
> Jennifer: Ohh! Way to go Stacey!
>
> Stacey: I worked on it this weekend (giggles) (February 9, 2017).

As evident in this excerpt, all five teachers participate in the discussion and all share their respective points of view about the logistics for Market Day. Kate raises a question about the number of books they would need; Tiffany replies to her question, "we had 15 books" then Jennifer shares additional information, "I have discovered that Dylan (pseudonym) [a student in

the class] likes to cut out Hero books, this engages him and keeps him focused." Then the teachers switch the conversation to selling the books to the second graders. In this excerpt, affirmation phrases illustrate a function that serves as an energy source during crosstalk. As an energy source, affirmations encourage the teachers to continue to engage in the conversation. For example, when Jennifer shares extra information then Tiffany extends the conversation to selling books to second graders; they then explore resources and various perspectives and practices to implement during Market Day. Affirmations consist of common utterances such as "mm hmm" and "yeah" and short declarative sentences such as, "I agree"; "I like the idea" or head nods. Also, laughter often followed statements of affirmations and was a common acceptance indicator. To Illustrate, in this next excerpt, the third-grade teachers are working on the PBL calendar when Kayla makes a suggestion about noting assessments.

> Tiffany: I think it will be good if we can go day by day. I need to do a better job with planning sessions.
>
> (Kate stepped into the room. She went to get the project calendar. Teachers look to daily schedules for the project. Pink sticky notes are formative assessments says Tiffany.)
>
> Kate and Tiffany took all the sticky notes off to start to work on the PBL calendar again.
>
> Kayla: We can do success skills for green.
>
> All teachers liked the idea. [Tiffany, Jennifer and Kate nodded their head with affirmation]
>
> Jennifer: I can kiss you now.
>
> Kate: Genius! (All teachers laughed) (January 12, 2017).

As seen in this excerpt, teachers discuss how they could plan more effectively. Kate takes the PBL calendar and starts to organize the sticky notes around different purposes. Then, Kayla

suggests matching different colors of sticky notes with different parts of the project. Her suggestion, to use the green sticky notes to represent success skills is accepted by the group members. Jennifer's statement "I can kiss you now" and Kate's expression of "Genius!" i.e., their affirmation of Kayla's idea, evidence their delight with the suggestion. Tiffany, Kate, and Jennifer also nod their heads implying their affirmation of Kayla's suggestion.

To sum up while collaborating, the teachers through inclusive interactions with affirmations, the third-grade team moved back and forth to share their ideas and decisions. As demonstrated in these excerpts, the use of affirmations helped focus the teachers on activity goals, strengthened group discussions, and offered reassurance for the efforts of the third-grade team members.

Expression Two: Pair Planning

The second sub-code under planning: a multitude of expressions is pair planning. Research indicates that for meaningful discussions to occur around curricular and instructional issues, teacher communities require structures such as scheduled, predictable planning times (Louise et al., 1996; Supovitz, 2002). In this study, pair planning was one of those structures and stemmed from the teachers' content proximity as well as their physical proximity. Stacey and Kayla taught social studies and ELA, thus they experienced content proximity. Kate and Jennifer taught math and science and their classrooms locations were close to each other, thus they experienced physical and content proximity. These proximities, content and physical, encouraged the collaboration of pairs of teachers. Jennifer talks about the content proximity and the physical proximity that promotes her collaboration with Kate.

> I would almost say from moment to moment. I mean it's one of those things that because of the nature of how we're organized, we have two ELA and social studies teachers two

> math and science teachers. I did a lot of planning with our whole team, but I say you know every day you know Kate and I [have classrooms that] are next to each other so I would reach out to her and say OK what are you doing? You know what am I doing.

Jennifer mentions how their content proximity and their physical proximity creates additional opportunities for her to plan with Kate. In the same interview, Jennifer discusses one of the benefits of being able to engage in planning with Kate.

> So as a grade level team it was very helpful to meet often and honestly you know even though we had formal hmm formal meeting times we were pretty much planning constantly you know just shooting emails back and forth or in the hallway in passing. I had this idea or texting you know just working together all the time (April 25, 2017).

In this excerpt, Jennifer explains that these proximities enable "quick check-ins" between Kate and herself. These quick check-ins, Jennifer reveals, are valuable and useful for their planning and instruction. Like Jennifer, Kate talks about her planning with Jennifer.

> I had to do a lot of planning with Jennifer because she's the other math and science teacher. Making sure we're on the same page whatever I did in my class and seamlessly flow into hers and vice versa because the kids swap so I would never want to say be relying on something that she was teaching that afternoon to happen in my you know to jump in my class and that day because one group of those kids wouldn't get it before I saw that or vice versa (April 25, 2017).

Kate emphasizes the importance of "being on the same page" and flawlessly switching "kids" between Jennifer's classroom and her classroom. She points out that pair planning enables both to be aware of their daily teaching content.

In a similar vein, pair planning supported "decisional capital" among teachers. Hargreaves and Fullan (2012) defined "decisional capital" as "the capital that professionals acquire and accumulate through structured and unstructured experiences, practice and reflection-capital that enables them to make wise judgments in circumstances where there is no fixed rule to guide them" (p.94). In other words, pair planning provided the third-grade teachers the flexibility to make decisions based on their respective circumstances and student needs. Kayla elaborates on the need to "tweak" things according to their students during her interview:

> Actually, I did have to tweak different things because on the other side, you do have more students I guess more talkative you know different things, they may go through different obstacles but where is on the other side between my class and Stacey's class. We know what works for our kids. We know we can't have too many things that are out of seen. Because they are a routine group (April 20, 2017).

Kayla in this excerpt, offers that pair planning allows teachers to continue working with each other to tweak things according to students need. Kayla offers that she and Stacey know their students and what works for them.

These quick check-ins, offered the teachers opportunities outside of the third-grade team's planning sessions to share and collaborate with each other. During these quick check-ins, the teachers did not discuss activities in depth rather they talked about problems they anticipated in teaching. Therefore, these opportunities for pair planning, contributed to the coherence in their teaching of content.

Expression Three: Individual Planning

The third child-code under planning: a multitude of expressions is individual planning. Using Lave and Wenger's (1991) CoP perspective when analyzing my data elucidated another

form of planning; individual planning. There were moments during the planning sessions when the teachers preferred to individually think through and plan the project. From time to time, the teachers chose to "figure out" the activities on their own in order to flesh out the lessons more fully. During interviews, three out of the five teachers mentioned that they planned individually. The desire to individually plan emerged typically from the teachers' different levels of teaching expertise or from a need to dig more deeply when preparing for their respective classes. Kate was one of the third-grade teachers who preferred to plan individually.

> I am personally a lot of times like planning by myself; I think better that way. So it's very difficult for me to kind of sit with a group and plan because I kind of like to spread things out, and I need more than the 20 to 30 minutes we get for planning (April 25, 2017).

In this excerpt, Kate mentions the challenges of planning as a group. According to her, group planning takes more time than individual planning. Additionally, she states that she thinks better when she plans by herself. Some of the teachers pointed out that they preferred to plan individually because they found it more efficient. To illustrate, Tiffany speaks about why she prefers to plan individually.

> Yeah, it takes a lot longer to plan things, and when it comes to me, planning by myself, individually yeah, because I know, I think it's the whole idea of me not having to get the point across in order to put something on the calendar. I can plan faster and because [its] more efficient when I plan by myself (April 25, 2017).

As seen in this excerpt, Tiffany discloses that she can plan quicker and more efficiently by herself. She offers an example that when planning individually, she does not have to get the point across in order to put something on the calendar."

Additionally, it was not always easy to follow or be on the same page with the other teachers in the group. At times, some teachers needed additional time to self-tutor before using technology in their classrooms. Jennifer, as a first-year teacher acknowledges that need during one of the planning sessions.

> Jennifer: The use of technology is different and depends on where you are… Teaching a subject, introducing it or reviewing. You need to educate yourself.
>
> Zehra: How do you educate yourself?
>
> Jennifer: I think a couple different ways. I rely on what other teachers find successful. Usually, if you do a little bit of research, if you look online or ask around, your colleagues, generally somebody will have something that they use. You can look it up yourself. I use a lot teacher to teacher and Pinterest. Even if I don't use all, I adopt the ideas (March 9, 2017).

As seen in this conversation, Jennifer's individual planning includes educating herself about how to use technology and the content she is to teach. Her individual planning time provides an opportunity to educate herself in different ways such as by looking online for information and by asking colleagues with experience about the technology tool or knowledge about teaching the content. She adds that, "even if I don't use all [ideas] I adopt the idea.

Change in Planning: A Non-linear and Iterative Cycle

The third sub-code under planning is called: planning: a non-linear and iterative cycle. Lave and Wenger's (1991) constructs of flexibility and change were useful in my analysis of the third-grade team's PBL planning. Lave and Wenger (1991) define flexibility and change as a community's flexibility to generate knowledge and to reinforce and renew existing ideas. Both flexibility and change contributed to the maintenance of this third-grade team's planning

community and appeared integral to the success of their planning sessions and the success of the project's implementation. Although when the teachers planned together they strove for coherence when planning and consistency when implementing those plans across their own classrooms, they were comfortable with making changes to the project. Changes within the project stemmed from differences in the needs of their students and sometimes from their weekly discussions about their different experiences which necessitated the need to make changes to their instruction.

At times, these changes enabled each teacher to revise and adapt project activities according to her student differences and needs. Kate explicitly describes the need to make such changes.

> Yes. And I think we do a lot of that in our classrooms anyway. We kind of have that understanding like this is kind of the broad way out. And if you need to tweak things based on your classes,[we] kind of do that even with math which we usually don't incorporate into the projects. We do that a lot; like Jennifer and I are saying, 'ok we're teaching fractions this week. We're teaching equivalent fractions, but here's a general way and you kind of do what works best for your kids in order for them to master fractions (April 25, 2017).

As Kate points out, during planning meetings, that they agreed upon a general framework for each activity with the understanding they could make adaptations according to their respective students' needs and interests. The perception existed among the members of the team that the flexibility to change plans likely strengthened the team's CoP.

In addition to teachers making changes to meet their students' needs, they also made changes if an activity did not work out as planned. When this occurred, teachers tweaked

activities to ensure a more successful implementation. Stacey's comment provides an example of making such a change:

> We had multiple ideas, so we gave them free rain for what their product was going to be, with very little parameters. And then we realized we might need to go back and revise that a little bit because some of them are coming up, you know, they are going to be bakers and they were going to bake cakes and do things like that. So we had to go back and have discussions about how [they have to use] things that we have in the classroom … you don't have an oven to utilize. And then we [teachers] even had to come back together and we decided we're just [going] to act. So we had that conversation with them [students] (April 20, 2017).

In this excerpt, Stacey states, "we kind of gave them [the students] free rain for what their product was going to be." They soon realize, that with minimal parameters, however, the students were unable to complete the task. Stacey adds they came back together as a team and revised the instructions for their students.

Besides student differences and needs, teachers made changes due to standardized testing schedules. For example, they adapted implementation of project activities to provide their students additional instruction on project content assessed on Georgia Milestones, a state required assessment, and to accommodate the District's testing timeline. Kayla discusses this:

> Initially, I wanted them to understand what is market economy for the United States. What is it like to be a consumer and producer. But when they take their assessment they knew all of the questions and answers about Market day. But different things like trade, they did not fully grasp. Those were the things I thought I would zone in on but it did not work how I wanted it to. Another thing was writing. Initially, I wanted full paragraphs

> but as time was going by and we are preparing for GA milestones, and we are finishing PBL. A nice well developed paragraph initially went down to five paragraphs just to say that we have an artifact (April 20, 2017).

In this excerpt, Kayla talks about how her students understood some of the project content, for example the meaning of Market Economy but not other content, such as trade. She shares another time she changed an assignment because of testing. Initially, the PBL unit required a well-developed essay on Market Economy in the United States, however she shares that she reduced the essay to five paragraphs because she needed to prepare for Georgia Milestones.

The PBL process required the teachers to make many adaptations once they began project implementation. For example, they needed to make revisions to reduce some portions of the planned activities during their weekly planning sessions. These alterations required individual teachers to engage in additional planning. While the PBL planning process required the teachers to perform comprehensive upfront project planning, Tiffany reveals that once they began their weekly planning sessions, they had to break the project into smaller sections.

> We tried …three or four times our driving questions, what we really wanted the students to get from this [project]. What if someone came up and asked us what are we learning? But, I want to say it didn't come together easily. We went back and forth over what our title would be (April 25, 2017).

Tiffany shares how they revised the driving questions, "three to four times" in order to make sure the questions reflected what they, "really wanted the students to get from this [project]." She adds teachers spent time rephrasing the questions and finding the right title for the project. For these teachers, when using a PBL approach, finding the right driving questions and title are essential for accomplishing the project's learning goals.

Technology Integration: Collaborative Exploration

In this study, looking across the third-grade team data, technology integration: collaborative exploration was one of three dominant themes. This code has two sub-codes with one child-code each. These sub-codes are: teacher instruction and conceptualization of technology integration. Figure 5 displayed the lay out of technology integration in below.

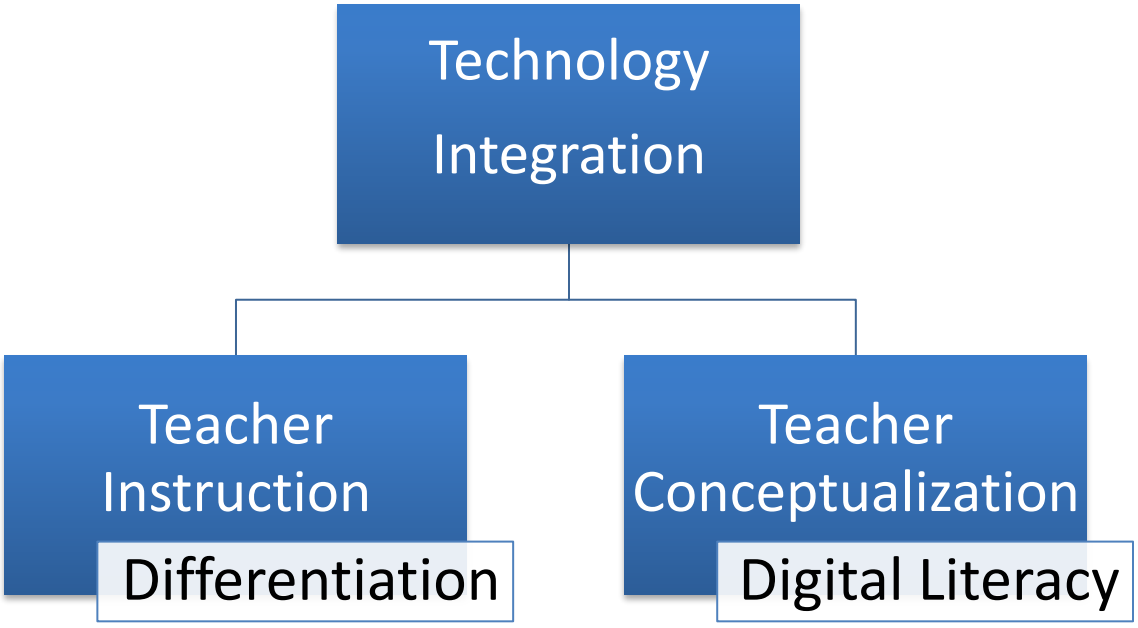

Figure 6 Technology Integration: Collaborative Exploration

Teacher Instruction

The first sub-code is teacher instruction. This sub-code has the child-code: differentiation. I describe both in the following section.

Teacher knowledge is a critical aspect of effective instruction and is generally conceptualized as a complex organization of systems of knowledge (Putnam & Borko, 2000).

These systems of knowledge include navigating the context of the classroom, the school, and the community (Putnam & Borko, 2000); along with teacher pedagogical knowledge (Shulman, 1986). Putnam and Borko (2000) suggest that these multiple systems of knowledge work together to form the foundation for teacher instruction. I view the complexity of teacher instruction in this study in terms of how teachers plan to integrate technology elements in their instruction. In my analysis, I focused my attention on noticing points of technology integration, particularly during their planning sessions. Data analysis revealed that technology integration had components that required teacher consideration while planning.

During planning sessions, the teachers actively sought both technical knowledge and technical resources. They applied their technical knowledge to their instruction, anticipating they would be able to use the technology to accomplish project learning targets. Characteristic of a PBL method, integrating technology within their teaching was not the traditional "teacher stand and deliver" model but rather one of student "guided exploration." Teacher instruction with an emphasis on guided exploration allowed the students to explore freely digital tools and websites. During planning sessions, teachers prioritized student self-exploration and peer collaboration over direct instruction. They planned in their lessons additional time for students to become familiar with digital tools or to navigate a website they would use when they worked on the project. Jennifer refers to this need to allow student exploration in her interview.

> I really enjoy teaming with my students, and you know I never introduce a tool, especially like a technological tool the first time without giving them 15 minutes of just messing with it push all the buttons to do whatever they want to do because they're going to do that anyway. And I would rather them do it when we don't have a purpose, you know, and let them just play with something that they're going to do. That's changing

> your wallpaper or changing all the colors on the screen or you know oh they notice that they can upload a profile picture or whatever. I let them just get that out of their system first. You press the buttons and the cool thing about that is while they're playing with it and they're tinkering, they usually figure out how to do it (April 25, 2017).

As seen in Jennifer's excerpt, when she introduces a new digital tool she provides time for the students to explore the new tool or website before using it for instruction. This gives the students a chance to "push all the buttons" and "change the colors on the screen" so they can "get that out of their system first." She adds that while the students tinker, they usually figure out how to use that tool. Like Jennifer the third-grade teachers included in their plans opportunities for their students to build their own understanding about how to use a digital tool or a website before the students used it in the project. Navigating through the Internet and locating information are important skills in new literacies classrooms (Leu et al., 2013).

As a next step in the exploration process, teachers gave the students a list of websites with project content information for them to examine. Three of the five teachers mentioned that allowing the students to explore specific websites prepared them to perform their own search. For instance, Kate states that:

> So even that sort of exploration isn't going to be productive. When I needed them to get stuff like get content knowledge, I would have about a list of five Web sites or something and they could go from there. Now I would try to let them explore with like images and videos and stuff. So let them search for those and find those you know wherever they could find them. But in terms of stuff they need to read and process and research. I chose their sites (April 25, 2017).

As seen in this excerpt, Kate scaffolds the students search for project content by providing them a list of five relevant web sites. While she directs her students in their location of project information, she also plans opportunities for the students to explore the websites for relevant images and videos.

It is important to note that throughout the planning sessions, teachers possessed criteria they used when they chose a website for their students to explore. Teachers talked about these criteria on several occasions. The first criterion was choosing a website that was easy for the students to navigate and had "third grade friendly" language. During a planning session, Stacey shares her to-do list when choosing appropriate websites for her third graders.

> I always do beforehand. I try to answer the questions whatever they have, and I just try to see if I have any questions I know they're going to have [or they might] get frustrated. So, I just try to see this [website] is third-grade friendly. Are we really going to be able sit down and navigate through this sources or is this going to take the whole class period to figure it out? So those are the things that I consider (February 9, 2017).

According to Stacey being "third grade friendly" means students should be able to sit down in a reasonable amount of time and navigate a website by themselves, rather than taking the entire class period to figure it out.

Another criterion was making sure the websites used language students could read. In this excerpt, Jennifer shares a past experience of choosing websites with vocabulary that was too difficult.

> I know there have been times in the past where I have tried to pull something up on a whim, and you know, the language is, you know, much more appropriate for an eighth grader or ninth grader versus a third-grader or specifically my third-graders. You know

> my block one students have a much, lower proficiency in reading than my second block does (April 25, 2017).

Jennifer's experience of selecting a website "on a whim" without regard for the language used on the website results in her students not being able to use the website. Consequently, now she examines the website prior to using it to ensure it matches the reading proficiency of her students.

Another important criterion for the teachers while choosing a website was the website should cover the curriculum standards in an interactive and fun way. During the planning sessions, each teacher discussed this as a consideration. Furthermore, considering content knowledge to meet the standards and instructional goal served as a guide throughout the planning cycles. Kate's comment acknowledges this criterion.

> Choosing the correct website is not always easy for third-graders. Again back to the standards, it needs to have the content that the standard covers for that they need to learn, and it needs to be on their level or, you know, a little below their level engaging to them and as interactive as possible. I also try to look for things that had some research stuff and like if it had some fun components to it maybe a game they can play you know Brainpop's always good for that. Like they can watch a video and after they watch the video they could play the game or they can do the vocabulary flash cards, that sort of stuff (April 25, 2017).

As seen in this excerpt, Kate selects websites that contain information to help the students master the required curriculum standards. She adds that she prefers the website to contain fun components.

Similarly, assisting students to meet state curriculum standards was also a criterion when selecting web applications. When choosing web applications, the teachers selected digital platforms that enabled their students to use and apply the content they were required to teach. Stacey shares the importance of this criterion.

> You may not like it but, I had to change. We were using Google slides for the social studies portion of the project. They were having fun, but they might not include what they need in their slides. I needed to make sure they [included] three things in a piece of paper. And then, we go forward and put it into Google Slides (March 2, 2017).

As seen in this excerpt, Stacey wants to make sure her students include the required content information when they create their Google slides for their social studies portion of the project. Covering the standards was an external factor that influenced the teachers planning. As revealed in Kate and Stacey's comments, "covering the standards" influenced their selection of websites and web applications. As reported by Champion (2017) in her study that examined elementary teachers' use of digital technologies, like the teachers she studied, Kate and Stacey sought websites and web applications that covered state curriculum standards.

The last criterion identified by the teachers for selecting websites was that the students needed to receive immediate feedback. The teachers preferred websites that gave the students instant results and feedback as they worked. Receiving immediate results motivated the students and increased their engagement. For example, Tiffany said that every day she uses the "Extra Math" website. On this website, her students work on subtraction and multiplication, and the students can track their daily growth. Kate shares that receiving immediate feedback on their performance is motivating to her students.

> We gave a Star Test yesterday. It is a big assessment. Math and reading are big. That's good. It [Star Test] immediately told us score and the growth and progress [of the student]. It is also motivating for kids [to receive] immediate feedback. Yesterday, as soon as we tested them, after the test I was able to show them their growth and progress (March 2, 2017).

As stated by Kate, math and reading are "big" for her third-grade students, because the Georgia Milestones tests assess these two content areas. For that reason, Kate uses Star Test software for math and reading. When taking the assessment on the Star Test, Kate's students immediately receive a score. The software also enables the students to track their progress. She says "it is motivating for kids" to receive immediate feedback.

Besides guided exploration of digitals tools and websites, teachers in this study indicated that teacher modeling is another part of planning to integrate technology. Jennifer talks about how she models for her students how to perform self-searches during her instruction.

> I'm very quick to always point out oh Ms. J. doesn't know. They ask me questions all the time all you know is this and this, and I always say you know I don't know what we can get up together and a lot of times when we do that I'll have them come down to the carpet and I'll search for that and we'll choose a good web site together so that is a good opportunity for me. That's I kind of show them how I search for things and how I find a good web site and that sort of stuff (April 25, 2017).

As seen in this excerpt, Jennifer comments about how she models for her students how to search for "good websites," pointing out her mistakes. Part of her modeling includes using opportunities when she does not know the answer to a question her students ask to demonstrate how to search the Internet. When this occurs, she calls the students "down to the carpet" to observe her use the

Internet to find the answer to the question. On these occasions, she and the students choose a web site with the answer. By doing this, Jennifer models for her students that it is okay to not know everything.

Besides modelling how to browse on the Internet, the teachers planned activities to encourage collaboration among students while they used digital tools. For example, the teachers mentioned that each day students have 20-25 minutes to use Chromebooks. Even though each student has a Chromebook, they give the students the option to work individually or with a partner. Although they provide this option, they prefer their students engage in more collaboration and group work. To illustrate, Kayla declares that:

> I think I lean towards more group work. Because they were in a business group. So they were getting their grades on how is your ethic, how is your communication, and collaboration with your group. So it is more group work, but the cool thing is they have one to one technology. They had to document. They would be able to share with each other, and they were able to work at the same time (April 20, 2017).

In this excerpt, Kayla reveals her preference "towards more group work." Group work, she says allows her to assess her students' group communication and collaboration skills. Research suggest that students are more successful in learning how to use a digital tool when given the opportunity to collaborate with peers (Lankshear & Knobel, 2007). The importance of collaboration is also a characteristic of the PBL approach used by the teachers. Therefore, the teachers created opportunities for students to collaborate in their use of technology.

In addition to planning activities that encouraged their students to collaborate using digital platforms, the third-grade team used the affordances of technology to revise and edit the

PBL research project. Kate reflects on the usefulness of technology to revise and edit her plans when the students begin their research about different habitats and regions.

> So how I did it this year was kind of interesting because I'm new to the 3rd grade, and I'm new to the whole one on one technology. So I was kind of learning with the kids, and I remember our first project. I gave them- what was it? It was Habitat's, and I kind of gave them free rain for research you have had I taught them how to use Google. And so they were searching the different habitats and regions. And then about 30 minutes in, I realize this is a disaster. We have to go back, and we have to revamp some stuff, mainly because, you know, most of the stuff that's out there for them is way above their level (April 25, 2017).

In this excerpt, Kate reflects on her instructional mistake when the students performed their first PBL project. Initially, Kate gave her students "free reign" to research on Google. After 30 minutes, she realized that her instruction did not work out as planned, and she needed to revise her instruction for her students in order for them to complete the task successfully.

As illustrated by Kate, revision and editing were central for the teachers' successful integration of technology within their instruction. When things did not work out as planned, they teachers immediately reflected on the process and made changes when needed. This reflection on the process encompasses integrating, evaluating, analyzing, synthesizing digital sources and constructing new knowledge. Most of time, the third-grade team shifted their instruction towards a model of information circulation, which highlighted the production, circulation, evaluation, reproduction, and communication of information (Lankshear & Knobel 2011).

Differentiation, meeting the different needs of their students, was another consideration of the teachers when planning. For the teachers, it was important for them to address each

student's needs especially those of students who struggle. Throughout the planning sessions, the teachers indicated that they needed to provide appropriate instructional modifications so they could meet the different needs of their students. Using technology to make these modifications was a common strategy used by the teachers. During the teacher interviews, each teacher mentioned that she used technology for intervention. Tiffany's comment represents the comments made by the other teachers.

> I use technology more so for intervention purposes. So my kids do a lot of math like that fact fluency. They use a program or website called Extra Math to practice their addition, subtraction, multiplication, and division facts. We also use a website called studyIsland which is a website where they play games, but they also are learning content at the same time. From time to time, we do a web quest where I'll give them a quest to find information about pronouns or about nouns. And at the end of it all, you should be able to tell me everything that you learned about this part of speech, and you should be able to use it in a sentence. And, you know, give me examples of it (April 25, 2017).

As stated by Tiffany, she uses several websites to provide additional support to enhance her students' mathematics and grammar skills. For example, she uses the website Extra Math so her students can practice their addition, subtraction, multiplication, and division facts, and she uses Study Island so her students can "learn about parts of speech" so they are "be able to use [the information] in a sentence."

Besides using technology to modify their instruction and to provide additional learning opportunities for their students, the teachers used technology to monitor the progress of their struggling students. Through technology integration, the teachers were able to differentiate their instruction in ways that would not be possible when using traditional paper and pencil tools. For

example, teachers discussed the advantages of using technology for reading aloud purposes. Each teacher confirmed that they had struggling readers in their classrooms, and at times, those students needed texts read aloud to them to enhance their comprehension of the texts. Stacey shares that she used Tumblr books to read texts aloud to her students who needed this extra support.

> I used Tumblr books specifically because I have some students who can't read and instead of if I teach ELA, and If I am asking you to read a book and you can't read the book and everyone else can read the book. I can at least tell you go put your headphones on and they will read to you (April 20, 2017).

In this excerpt, Stacey reveals she uses Tumblr books with her struggling readers. The read aloud feature in Tumblr books supports her struggling readers. Stacey's use of technology for extra suport for her students is supported by research that reveales that the use of digital instruments can boost students' reading comprehension. Multiple tools such as iPads, e-readers, podcasts, and apps are thought to enhance existing literacy practices (Hutchison, Beschorner & Scmidt-Crawford, 2012).

A final component I discuss for the sub-code teacher instruction, is that the teachers assumed different stances toward integrating technology. In addition, the stance a teacher assumed appeared to influence her perspective about integrating technology in her instruction. Leander's framework (2009) helped me to understand these differences in teachers' perspective toward technology. This framework describes four common stances teachers assume toward the relationship between digital literacies and conventional print-based literacies: remediation, resistance, replacement, return and remediation (Leander, 2009; p.147). Leander defines remediation as teachers who view technology as a tool useful for providing students extra

instructional support on basic skills. For example, Tiffany's use of the Extra Math software to boost her students' mathematics skills. Leander (2009) defines resistance as when teachers avoid integrating technology because they believe conventional print-based literacy practices are more effective. Replacement is defined as the opposite of resistance; representing when teachers seek to substitute print literacies with digital literacy practices. Replacement is the dominant stance for all members of the third-grade team. However, occasionally, during the planning sessions, some of the members of the team demonstrated a return stance, a stance described by Leander as falling between resistance and replacement. Teachers who demonstrate a return stance express a value for digital literacy practices but support conventional print literacy learning (Leander, 2009). For instance, Tiffany reveals a return stance when she states she prefers print-based materials when teaching foundational mathematics and reading skills.

> When kids come to me, I have the lower kids. We do reading and math, and I do foundational skills. So, we don't use Chromebooks often. I prefer to limit technology unless I am teaching oral stories for comprehension purposes. I use print books. For teaching concepts and foundational skills that we are still learning, I prefer us [to discuss] in a discussion setting. Because most of the time, my children don't ask questions. I don't use questions too often. I use them for extra math program, for math fluency. I use it for Tumble books, storytelling, story line online. Other then I feel like it is more effective to discuss, and you know, to have tangible assignments (March 9, 2017).

In this excerpt, Tiffany says, "I use print books, for teaching concepts and foundational skills" and she prefers, "to limit technology" to when she teaches, "for comprehension purposes." Although Tiffany values digital literacy practices her comments underscore her support for using traditional print literacy at times during her classroom instruction.

Conceptualization of Technology Integration

Conceptualization of technology integration is the second sub-code under technology integration; this sub-code contains one child-code: definition of digital literacy. I describe this sub-code as well as its child-code next.

Teacher Conceptualization of Technology Integration. I examined the third-grade team members' understanding of technology integration in two ways: First, I examined the conversations during the observed planning sessions and the teachers' comments during teacher interviews for statements related to technology integration, and second, I analyzed their responses to the question I asked each teacher during her interview, "What is your definition of digital literacy?" Examining their views of technology integration from these two different sources helped me to understand their views more comprehensively.

The members of the third-grade team understood that integrating technology within their instruction is important. They knew that such integration would help their students develop the skills needed to be successful in the 21st century. To illustrate, in this excerpt, Kate explicitly ties the use of technology tools to her students' future success.

> I think the most important thing that I'm thinking of as I'm planning is that I know that these are tools that they'll need in order to be successful. Whether that's in high school or college most specifically in the workforce; that if they don't use these tools and know how to use them well and fluently, they will be left behind (April 25, 2017).

In her comments, Kate says, "I think the most important thing that I'm thinking of as I'm planning is that I know that these are tools that they'll need in order to be successful." She states her students will need these skills to be successful in high school, college, and in the workforce. And, she continues, if they do not develop these skills, her students "will be left behind." Hayes

and Jacobs (2014) provide support for Kate's statements by asserting that modern literacy instruction is essential for preparing students for the 21st century world. Similarly, during one of the planning sessions, Kayla spoke of the importance for her students to use technology in school. "When all the kids have that one to one technology, it is beneficial because they are working on 21st century skills; they are able to do things that some third-graders cannot do. That's why it is very beneficial" (January 26, 2017). In Kate's comment, she implies that for her students, working on technology individually provides practice in developing 21st century skills. Technology promises to make learning more relevant and engaging (Moore, 2013) and having one to one technology impacts the learning process by personalizing learning (Bruce & Casey, 2012).

Teachers' understanding of technology integration was also associated with their knowledge of their students' school experiences. Jennifer references the changes that have occurred in the significance of technology.

> Like I think it's very different than the way I was raised, and it's different than the way my parents were raised. And I feel like you can't help but be literate at this point in the game especially when you have technology all around you all time. Maybe it's different than the way certain people would imagine to do literacy, you know. Do you understand the written word versus pictures? Do you understand all the sources? (April 25, 2017)

In this excerpt, Jennifer compares her parent's childhood literacy experience with the experiences of today's students. She says that being literate today is very different from previous conceptions of what it means to be literate. Today, "technology [is] all around you." Today, unlike for previous generations, it is important to consider different communication practices.

She points out that being literate means more than just considering print forms and includes different forms of communication such as pictures and other visual resources.

In the 21st century, being literate is tied to being a digital citizen and is tied to engaging in a participatory culture (Jenkins et al., 2006). Prensky (2015) identifies students in the 21st century as digital natives referring to students born in and after the 1980's. Digital natives live in a technology-rich society and are fluent in the digital language of computers, video games, and the Internet. Jennifer alludes to what this means for her students.

> But they [students] have such a different understanding of what it means to be a digital citizen and what it means to understand you know media that is shared. They're much more comfortable. You know they're native, whereas you know that was something I was taught, and maybe I was taught a little bit more explicitly, and I was taught more of the background that there are the citizens you know maybe I'm the builder, but they are the citizen which is an interesting sort of kind of you know perspective on it (March 2, 2017).

As Jennifer states, digital citizenship has different meanings for non-digital native citizens. Jennifer recognizes that her students know about shared media by being exposed to and using them not because they were explicitly taught about these media. According to Jennifer, digital citizenship, i.e., being native, refers to being born into the digital world. This realization influenced Jennifer's instruction.

Similarly, some of the teachers talked about the importance of teaching their students what digital citizenship means and what it looks like before they use technology with them. For example, during one of the planning sessions, Kate shares her plans for how she will introduce technology to her students next year.

> Next year when we do this [project] I will definitely start out the year by incorporating more technology. I don't think we told you this before more time like work period for teaching the technology tools and even teaching about being a digital citizen before they touch a computer and what that means what that looks like. So just more instruction, before they actually go out and explore (February 9, 2017).

In this excerpt, Kate shares her plans to teach her students about what it looks like to be a digital citizen and what digital citizenship means, "before they actually go out and explore" technology tools.

Another point of the teachers' understanding of technology integration was the relevance of technology to their students. Technology has real life application to their students' daily lives. Jennifer underscores this idea of relevance during her interview.

> For me personally, I'm like they get so much out of just having it [technology] be relevant to their lives. Like I feel technology is relevant for them. And it will always be relevant for them. And the more relevant you can make a lesson or a concept the more they're going to get out of it [the lesson] (April 25, 2017).

Jennifer in this comment acknowledges that for her students, technology is "relevant for them," and "it will always be relevant." Thus, by implication, Jennifer acknowledges that connecting her instruction with technology makes her instruction more meaningful to her students, and therefore they would "get more out of it." Jennifer illustrates what Darling-Hammond, Zielezinski and Goldman, (2014) and Ito et al., (2013) refer to when they proffer that meaningful and real-life connections promotes deep learning. Furthermore, applying classroom knowledge to solve real-world problems promotes deep learning (Ito et al., 2013). Research suggests that a

project-based learning model fosters real-life connections and stimulates collaborative learning (Darling-Hammond, Zielezinski & Goldman, 2014).

The data analysis revealed that technology integration included two main components, the teachers' instruction and the teachers' conceptualization of technology integration.

Digital Literacy Definition. Teacher conceptualization of technology integration also involved understanding the teachers' definition of digital literacy. In order to gain insight into the teachers' understanding of technology integration, teacher interview data were analyzed to ascertain the teachers' definitions and understandings of digital literacy. Each teachers' definitions are represented in Table 7.

Table 7 Teachers' Digital Literacy Definitions

Teacher Name	Definition/Key Words
Tiffany	Using technology regular basis as a learning tool
Kate	More than being digital citizen, being cognizant citizen
Jennifer	Navigate and comprehend text w/ digital media
Stacey	Reading e-books
Kayla	Literacy within technology in digital world

First of all, I believe that understanding the teachers' definition of digital literacy is the initial step in revealing in their instructional focus on the need to provide a richer and more complex learning environment for their students. For the purpose of this study, digital literacies "refers to reading and writing of digital texts, for example being able to read a website by

navigating through hyperlinks and writing by uploading digital photos to a social networking site" (Hague & Williamson, 2009, p. 5). In this sense, digital literacy refers to the functional skills required to operate and communicate with technology.

Besides functional or technical definitions, digital literacy includes an amalgamation of social awareness and critical thinking (Hague & Williamson, 2009). The social aspect of literacy shifts the focus from individual use of technology expression to participatory involvement (Jenkins, et al., 2006). While understanding digital literacies it is important to unpack the meaning of digital participation. The concept of active and collective participation has been examined in a white paper authored by Henry Jenkins (2006). Borrowing from Jenkins et al., (2006), I define participatory culture as establishing relatively low barriers to artistic expression and civic engagement with strong support for creating and sharing one's creations with others, and that their contributions matter, and members feel some degree of social connection with one another (p.7). Further, Jenkin's (2006) idea of participatory culture centers on "membership" in meaningful social and cultural contexts. Participatory culture provides access to membership in authentic space for learning new skills (Jacobs, 2012). These new skills include participation through play, performance, simulation, appropriation, multitasking, distributed cognition, collective intelligence, judgment of texts, transmedia navigation, networking, and negotiation (Jenkins, et al., 2006, p, 4). These skills are not about how to use technologies, but rather, the type of thinking afforded by these technologies specifically those that involve different values and norms.

To sum up, new digital technologies enable new ways to construct, share, and access meaningful content. Additionally, the collaborative, distributed, and participatory nature of digital spaces require teachers to orchestrate learning opportunities. With these thoughts in mind,

I examined the teachers' definitions of digital literacy. I looked for these characteristics of digital literacies in teacher definitions during interviews. Out of the five teachers, four mentioned one or more of the aspects identified previously. To illustrate, Tiffany states that:

> I would say that digital literacy involves being aware of technology and using technology on a regular basis, not just for fun and not just for games. Knowing that technology is actually a tool to help you learn. I think it encompasses a lot for students. It is being able to use the Internet as a resource for information. It's also being able to use the Internet for, being literate. What else would I say? I would really just say that it is using technology as a learning tool
>
> (April 25, 2017).

In this excerpt, Tiffany points out the importance of using technology as a learning tool. Her understanding of technology mirrors how she planned to use technology during her instruction. During planning sessions, Tiffany was the one who most often spoke about her plans to use Chromebooks and specific websites to enhance her students' mathematics accuracy and language fluency. Tiffany's statements of how to integrate technology during her instruction aligns with her definition of technology as a learning tool.

In addition to the teachers' definitions being echoed in the planning of their instruction, the teachers recognized that their definitions of digital literacy had evolved as they gained new information about features of digital literacy. Kate in her comments explains how new information expands her understanding of digital literacy.

> I also think that was before they even encountered technology, like the hands-on technology as much is important that they understand that as well that there's more to being a digital citizen than just looking at the actual computer screen. So that's changed

> this year with ISTE. I was always under the impression, that digital literacy was always about having computers or having some sort of technology at your fingertips. But I've come to realize that that's not necessarily the case. It's also about being a good cognizant citizen and aware of all of these things (April 25, 2017).

Kate shares that working with the ISTE standards influenced her understanding of digital literacy. Prior to her exposure to these standards, Kate shares that she associated digital literacy with only using computers. Now she understands that digital literacy not only reflects having technology at your fingertips but also means "being a good cognizant citizen." Kate illustrates what Borko, Shavelson and Stern (1981) maintain that identifying conceptions of teacher thinking is an important step to understanding the processes teachers use when planning instruction and influence their orientation to integrating technology on their instruction. Their reference to orientation aligns with Leander's (2009) framework of stances teachers assume toward using technology in their instruction.

When I examined the teachers' definitions of digital literacy, Jennifer was the only teacher who used definitions similar to those used by new literacies researchers. She highlights this during her interview.

> I think that digital literacy, when we talk about literacy, we talk about, you know, basically your ability to navigate and comprehend text usually but with digital literacy. I think there's more of an expanded sort of idea about that where it's not necessarily just text based but it's also images. It's media. It's you know basically all sources of input that are coming into you and also just being able to navigate that (April 25, 2017).

In this excerpt, Jennifer underscores the significance of the reconceptualization of literacy based on multimodal influences. Her statements imply that she recognizes that digital literacy includes

the ability to navigate through different sources and the ability to comprehend online text. She also points out that digital literacy not only consists of digital text but also includes images, "all sources of input." In addition, throughout the planning sessions, Jennifer was one of the most eager teachers to look for ways to incorporate technology in her planning and instruction. She makes the following statement during one of the planning sessions.

> That's not to say every lesson you know is something digital but a lot of it is. And I love it that way. And my kids love it that way, and I feel like those lessons that we do you know definitely do have that digital component even if their hands are not on an electronic device (February 9, 2017).

Jennifer states she loves to incorporate a digital component in her instruction. Hence, she includes digital technologies even if her students' hands are not on an electronic device. Kayla in her definition of digital literacy is another one of the third-grade teachers who mentioned the idea of reconceptualization of literacy in her definition.

> I think my definition would be a variety of things. Because I am the language arts and reading teacher. We do a lot of literacy within technology, trying to integrate it. Being able to using graphic organizers, organizing your thoughts and different parts of the story which are elements of the project for our reading piece is actually writing, opinion writing. We are trying to get the students to be the producers to try to get their consumers to wanna buy their product. So with that, we did end up having them type their different information. But I guess digital literacy would be integrating what you would use tangible but using in a digital world (April 20, 2017).

Kayla relates her definition of digital literacy with how she uses technology during her instruction. As one of the language arts and reading teachers, she states that she uses graphic

organizers to help her students to organize their thoughts. She also includes a persuasive writing piece which helped her students to understand producer and consumer perspectives for the project. Her definition included the writing components in a digital world.

On the other hand, Stacey, the sole ELA teacher in the group, was the only teacher whose definition did not provide any phrases or explanation of her understanding. She does, however in the following comment, mention using e-books:

> I think that digital literacy is, hmmm, reading, reading. Like we did a lot of reading on e-books and buying books and reading them. That's what we did. And, there were some other things we use Wordle and things to make vocabulary words. So that's my understanding of digital literacy (April 20, 2017).

Stacey's definition does not reveal an in-depth understanding of digital literacy. Rather than describing digital literacy, she talks about e-books, and states she uses them with her students. During one of the planning sessions, she reflects on her use of digital tools.

> To be honest, I have not used digital text like I did during my school teaching. I would literally buy books on the Ipad and sit down, and it was so interactive. I forgot we don't even have Ipads at school. We are so Chromebook. But I feel like that was cool on Ipad. It was just a little flip on the pages, and I miss it actually (March 9, 2017).

Stacey states that she used digital tools more during her student teaching than she does now. She says that she used to buy books for the Ipad and use them interactively. Now, Parker Academy uses Chromebooks instead of Ipads which she says limits her ability to integrate technology in her instruction. Stacey provides additional information about why she does not use technology as often with her students.

> I think it has benefits and downfalls. Because unfortunately Chromebooks don't have a filter on it. So, you know like a firewall, you can't go to this site like that. That's the downfall. I am giving the downfall first. And then the students are able to open up games when you want them to do tasks, and it is hard to monitor all the kids when they have that one to one technology (April 20, 2017).

In this excerpt, Stacey talks about both the downfalls and benefits of technology integration. She expresses concerns about having a hard time monitoring all of her students as they use Chromebooks. She also shares that Chromebooks do not have a filter, needed to prevent her students from playing games when she wants them to work on their projects. As a consequence, she says using individual Chromebooks makes it hard to monitor all of her students.

To sum up, all third-grade teachers' definition of digital literacy paralleled their understanding of how to use digital technology in their teaching. My focus on the teachers' definitions of digital literacy and digital participation provided a way for me to understand the teachers' view of integrating technology in their instruction.

Constraints: Roadblocks

Teachers experienced constraints, i.e. roadblocks to their planning. The theme of Constraint has four sub-codes: access and technical issues, lack of time, personality differences, and shared knowledge. Rather than addressing one of the three research questions, this theme provides information related to all three research questions. Throughout the planning sessions, the teachers discussed challenges. Identifying and overcoming these challenges were essential steps in the project's success and viewed by the teachers as a reality of working within this planning community.

Infrastructure

Infrastructure was one of the primary constraints experienced by the teachers. Constraints labeled infrastructure include stable and reliable internet connectivity, the availability of digital devices such as Chromebooks, the timely repair of broken technology tools such as keyboards, mouse, and the inadvertent loss of shared documents.

While most of the time internet connectivity was stable and reliable, some interruptions occurred during the planning as well as during project implementation. Tiffany recalls such a time during her interview.

> That is a small all day struggle--Internet connection. I would say just making sure that kids have sound and a fast connection while they are working on their projects. Or if it's a hardware thing you, oh my sound doesn't work or you know whatever. We know we have one or two people who are able to come troubleshoot issues as far as resources (March 2, 2017).

Parker Academy employs personnel who sort out Internet access issues and computer program technical issues for the teachers. Having technology support creates relief for teachers.

However, occasionally teachers had to deal with broken technology tools. For example, on several occasions, the students experienced problems with the Chromebook keyboard or mouse. Chromebook possesses applications that run in a browser and store user data in the Cloud. When technology tools were broken, teachers had to come up with alternative plans. Jennifer mentions a time this occurred during a lesson she was teaching.

> The one thing I can think about, and I think this is maybe just third-graders being third-graders. But, we do have problems with our Chromebook keyboards. Kids break the keys and just getting those repaired in a timely fashion, We found ways to work around it. You know there's an on-screen keyboard that you can use and my students know at this

> point how to set that up if something doesn't work. I'll just turn on the accessibility mode the onscreen keyboard and then all of the other things that come with that like the giant mouse cursor and all of the other things. So they will definitely take care of each other if you know your Z doesn't work and you need it here and this is how you fix that (April 25, 2017).

Teachers also experienced challenges when using the tools with their students. For example, the teachers talked about the need to build their students' knowledge of how to use shared documents stored in Google Drive. Kate identifies this concern during one of the planning sessions.

> Kate: We had a couple of issues. Not only in Google slides but in general. Somebody will delete something, and we could not save it. Even if they delete it. We have lots of documents.
>
> Tiffany: Did you back up students work?
>
> Kate: Well, they saved in Googledoc, but it is a live document. And they share with us, but when you delete it, its gone (March 9, 2017).

Time

Time was another constraint or roadblock experienced by the third-grade team. Data coded in this category included reconciling different views in group planning, balancing covering state standards, conducting district required testing, and accommodating non-instructional related responsibilities. On multiple occasions, teachers expressed concerns about the lack of time they had to plan and implement the project. Concerns about time surfaced in the teachers' comments during interviews. Teachers indicated that working in a group and planning together takes more time than planning individually. They proclaimed that group planning

requires them to reconcile different views about instructional priorities, such as direct instruction versus peer collaboration, and to accommodate different planning styles, such as preferences for individual planning. Reconciling and accommodating differences by working to find common ground was not easy. Tiffany mentions her concern about time during her interview.

> It takes a lot longer to plan things and when it comes to me planning myself individually yeah, I really because I know, I think it's the whole idea of me not having to get a point across in order to put something on the calendar. I can plan faster because its more efficient when I plan by myself (April 25, 2017).

In this excerpt, Tiffany mentions that it takes less time for her to plan individually. She highlights that she "can plan faster because its more efficient when I plan by myself." Individual planning is more efficient, she says, because she does not have to spend time "to get a point across in order to put something on the calendar."

Besides, reconciling different views in group planning, teachers expressed frustration with the time spent working on their projects, balancing project teaching with covering standards, and preparing the students for the Georgia Milestones. For example, during one of the planning sessions, the teachers expressed concerns about not being able to spend time teaching the concepts of *public* versus *private money* and using money for public resources. Instead of teaching the content they thought was important they had to focus on the big ideas of economics and taxes, content covered on their grade level standards and assessed on the Georgia Milestones test. During this conversation Kayla laments: "But [the reality is] they have to pass the Georgia Milestones reading portion in order to [progress to] 4th grade. So, it's kinda like some days I have to put [project teaching] aside and zone in [on] reading. It was kinda difficult" (March 9, 2017).

Kayla's statement suggests her frustration when she has to put aside her project teaching to focus on assessment preparation. In this excerpt, she implies that working on the project and working on reading are two separate things which need a different focus, thus required additional time. However, this view does not align with PBL's core values and vision (Buck Institute, 2016). PBL has a holistic view in which students master core academic content and assessment of the content occurs through experiences that engage critical thinking, problem solving, collaboration, and communication. From a PBL perspective, testing and working on a project are woven together and they complement each other and should not be viewed as distinct events (Buck Institute, 2016). Kayla's ambiguous understanding of PBL causes her frustration about the project.

Finally, time that is taken away from project teaching to accommodate unexpected interruptions in their teaching. Teachers coped with abrupt changes in their teaching schedule by reducing the number of PBL planning sessions and the number of PBL planned instructional activities. During my data collection, I witnessed three last minute cancellations of the teachers' planning sessions. They made up only one of the three sessions. Kayla expresses her frustrations about these unexpected school interruptions during one of the planning sessions.

> The only issue we had was, when we laid out our calendar was doing different things and what happens without our control like any assembly, anything like that. That when we have little bumps on the road, Ohh it is fire drill Oh it's a picture day. It's like things that just take your time that you didn't account for. But we regain and have a successful project at the end. And not necessarily because of planning but because of things that happened in school (March 9, 2017).

Kayla calls these interruptions “little bumps on the road.” She talks about things that they did not account for when they planned their project such as picture day and fire drills. These are unexpected interruptions that happen and are out of the teachers’ control; yet, they take time they needed to ensure a successful project at the end.

Lack of Shared Knowledge

In this study, lack of shared knowledge refers to the teachers having a vague and ambiguous interpretation of PBL as well as possessing different views about collaboration, teaching, and learning. Each teacher on this third-grade team brought different teaching styles to the planning sessions. While the teachers worked together and learned new knowledge and instructional practices from each other, at times their differences resulted in disagreements and difficulties in finding common ground. Interestingly, although these road bumps generated challenges in coming to a conclusion, they did not result in interruptions in the planning sessions.

One area in which the teachers did not share knowledge was in their interpretations of PBL. Some possessed a vague or ambiguous interpretation of PBL. Ambiguous interpretations of PBL included interpretations of how to identify real-world problems and issues for the students to investigate, how to create a collaborative peer learning environment, as well as how to design student-directed instruction. An ambiguous understanding of PBL was evident in the teacher’s inability to view PBL as a holistic and integrated way to teaching. This lack of shared knowledge led to confusions when planning resulting in times when some of the teachers’ planning suggestions did not align with the vision of PBL. Tiffany, who was more experienced with teaching within a PBL model points out teachers’ ambiguous interpretation of PBL approach during her interview:

> PBL sounds nice but I think when they're in the classrooms they are thinking about what their kids know; what they need to know. And that kind of goes back to let me teach them and make sure that they understand these concepts instead of thinking about it as like this holistic project you know (April 25, 2017).

In this excerpt, Tiffany refers to some of the teachers' lack of understanding of PBL as a "holistic project" which leads to different views of what PBL means and how it looks when implemented in the classroom. As a result of this inability to grasp a holistic conception of PBL, she says that some teachers revert to traditional teacher-directed methods which focus on teaching individual concepts instead of student-directed and collaborative instruction.

Similar to having different views about PBL, the teachers held diverse perspectives about teaching which at times resulted in suggestions being made that did not align with a PBL vision. Kate alludes to these differences:

> I think we're all comfortable sharing it [ideas] freely. I think it's sometimes not heard. So, I think for our planning that was probably the most frustrating part. Like even if you don't agree, everyone, you know, can state their [*sic*] own opinion. But a lot of times, that kind of goes in one ear and out the other. And that's the tough part, and again it's tough planning with five different people who have different opinions and different ideas. And then different experience as well (April 25, 2017).

In this excerpt, Kate shares her view that teachers had different experiences and possessed different ideas about how to teach. She says, "that's the tough part and again it's tough planning with five different people who have different opinions and different ideas." Planning in a group within a specific learning model and agreeing on the project activities was not easy and was "the most frustrating part" of planning as a group.

Differences in knowledge of PBL were revealed not only in planning but also in the teachers' implementation of PBL in their classroom. PBL required the teachers to integrate curriculum, which in turn, required the teachers to share knowledge about how to teach to ensure the students mastered the necessary context and knowledge about how to share knowledge about how that content should be taught. For example, because Kate taught math and science and Jennifer taught math and science their portions of the project required they build on each other's content when teaching. Additionally, they shared students, so they needed to share an understanding of how to teach the same content, such as place value of whole numbers, was taught. To illustrate, if the students did not learn counting on by ones, tens, hundreds and thousands in Kate's classroom, when they then moved to Jennifer's class, she had to go back and fill in the missing content and reteach these components.

> When we may have a teacher out students out, when they miss those days, you have to go back and make sure that they made their products. Cause, they are making products for Market Day and [you have to] make sure they had enough time but in the same token I know that I am trying to make sure they know how to read and do those different components in third-grade. But I have to go back and also teach social studies part. In order, what needs to work in my room, I needed to be working in your room. So [when] integrating if you're behind and then I am behind. They're not learning what they needed to learn in there then they can't do it here. So that's tough. So, just like the kids have to collaborate [we have to collaborate] (April 20, 2017).

As Kayla states, being out of school, missing days created a loop or a gap in the project when teachers had to "go back and make sure that students complete the missing part" in order to be on track in the project. Additionally, within this PBL approach students as well as the teachers

collaborate. Each teacher needs to teach the planned activity of their content area before the students move to the other teacher's classroom. It is very important to share this perspective about teaching while working in PBL. At times, not having the shared knowledge of instruction resulted in missing pieces in the project implementation and gaps in the students' learning experiences.

Personality Differences

From a CoP perspective, the concept of identity focuses on the individual while recognizing the influence of the social aspect of learning. Learning is concerned not only with developing ways of knowing in practice but also understanding who we are and what potential we have (Lave & Wenger, 1991; Lave, 2004). Community of Practice is intended as a conceptual bridge that "learning is never simply a matter of the transmission of knowledge; acquisition of a skill." Individuals participate in multiple communities in practice. Each community possesses different norms for behaving and repertoires of member experiences. Furthermore, individuals bring to these communities their early-socialized dispositions to act in similar ways in different communities (Mutch, 2003). Likewise, conflict is experienced and worked out through shared everyday practice in which differing viewpoints interplay. In other words, members of a community negotiate differences in personality as they seek to accomplish a shared task (Lave & Wenger, 1991; Lave, 2004). It is a reciprocal relation between persons and practice. This conception of personality aided my analysis of the role identity played as these five teachers negotiated power and membership within their planning group. In this study, occasionally, personality differences created challenges and impacted the group's decision making. Through my interactions with and observations of the teachers, I noticed one of the third-grade teachers

exerted more voice than others. The following comment by Tiffany reflects comments made by other teachers in the group about this teacher.

> (Giggles). I love Jennifer to death, but she can, she sometimes gets lengthy and she'll talk a lot about her opinion or her point of view and, I don't know it kind of just sometimes [she] dominates our planning. I think it's more because of the personalities of the team. Yeah, I think it's because of the personalities, and it makes it difficult to plan in the group (April 25, 2017).

In this excerpt, Tiffany comments about Jennifer's personality. She states that sometimes Jennifer dominates the planning meetings by getting "lengthy" stating that "she'll talk a lot about her opinion or her point of view" and she continuously shares her point of view. She adds that these personalities make planning difficult within the group. Although Jennifer, was new to the third-grade team and to the school, because she talked "a lot" and at length" her voice dominated some of the sessions, and as a result she held more power during the discussions. Even though she talked "a lot," the teachers did not always agree with her. At times, she only exerted the power to dominate the discussions rather than to influence decisions they made. Even though other teachers did not mention Jennifer by name, they made general references to challenges caused when some members in the group are "very vocal." Kayla speaks about this during her interview:

> I think a lot of your character shows. How you are a person. That's what it is. I am not one that is very vocal, I can show you better than I can tell you. And you always have those two-three [persons] that [*sic]*are more vocal and that hmmm t they want their ideas out [there] and they want you to follow what they say. Often, it doesn't work. I go with that, but that does not work for me. Sometimes you have to sit back and let other people

> have floor. And I feel like there were several times where I sat back and let others have the floor (April 25, 2017).

As Kayla says, she was not "very vocal" while in the group. Others, she says, however, "are more vocal and want their ideas out [there] and they want you to follow what they say." As seen in this excerpt, Kayla relates personality differences such as being vocal with exerting power during discussions. Interestingly, on these occasions, the group members did not adhere to the norm of collaboration during discussions and conversations. Instead of group conversations and sharing ideas during these times, Kayla states she is willing to "let other people have the floor" while she quietly attends to the meetings.

However, spending time together, getting to know each other's personalities enabled the teachers to develop a history together which helped the group to overcome challenges brought on by differences in the group member's personality. Stacey alludes to the group's ability to overcome such challenges as they created their history as a community.

> This was our first time, [for] a lot of us meeting [together]. Yes. So, that was a big difference in trying to get past a new person. You know like their attitude their personality at first you don't know if people are intentionally being standoffish. But by the second PBL, we had worked together for several months, and I am like that's how she is then you can talk [and] I will be quiet. It is ok. I trust you. You have good ideas. You know like at first ones, kinda like everyone felt like they had something to prove. They had to dive in and make their mark (April 20, 2017).

In Stacey's comment, she acknowledges challenges that would take place in any collaborative community by comparing the group's planning of first project with the second one. She says there is a "big difference in trying to get past a new person." As a positive, after spending time

together, the third-grade team started to recognize these differences as representing different interests and skills which created the benefit of a richer repertoire of resources for project planning.

The teachers specifically attributed some of the challenges they faced in the group as the result of personalities rather than teaching style. During one of the planning sessions, Tiffany and Jennifer disagreed about an activity to include. At the end of that session while the third-grade team was still in the room, Kate came up to me and refers to this conflict and the group's aim to eliminate the tension in the room. "I think that has a lot to do with personalities and not necessarily teaching styles. I'm sure that would come into play with any, with any kind of planning situation. And I think different people handle that differently as well" (February 9, 2017).

It is important to note that the glitches wrought by the challenges that occurred within this group did not overwhelm the planning sessions. These challenges created a community with a history that included the capacity to resolve conflicts. Rather than overwhelming the third-grade team, overcoming these challenges maximized the effectiveness of their instruction (Hutchison & Woodward, 2014).

To sum up, this single case study set out to answer three questions. Below, I summarize the findings as they relate to the three research questions.

Summarizing Findings by Research Question

How can elementary teachers planning be described?

This study indicated that the planning process was a dynamic, non-linear, and an iterative process which required revisions and edits during the project planning and implementation periods. Planning was a dynamic process created by multiple internal and external factors The

elements of internal factors include mental planning, preparation, and teacher experience. These elements helped teachers foresee how to proceed and plan. In a similar vein, external factors, student perspectives, curriculum standards /assessment, administration, and PBL approach influenced the teachers' planning process. The standards were the initial and the most important point that the teachers focused on at the beginning of the planning process. Teachers referred to the standards as a roadmap that kept them on track. Additionally, the school-based initiative of the PBL approach served as another external factors. In planning sessions, the third-grade team spent time matching the project content with curriculum standards, making sure project content was engaging for students, and having the end goal of the PBL project in mind while prioritizing student self-exploration, peer collaboration, and problem-solving skills. The PBL approach enabled the teachers to change the order of activities and assessments according to their students' needs and the project's progression. This flexibility generated the non-linear sequence during the planning sessions. There were also challenges/roadblocks that occurred during the planning and implementation of the project. These were access and technical issues, lack of time, personality differences, and lack of shared knowledge. The teachers viewed these challenges as a reality of working within a community. These constraints did not result in interruptions in the planning sessions.

How do elementary teachers interact in their planning sessions?

This study illuminated the nature of the interactions of the teachers during planning meetings. Planning for the teachers was expressed in three different ways: collaborative, pair, and individual planning. Collaborative planning encompassed being mutually engaged; having a common purpose; and sharing a repertoire of procedures, techniques, resources, ideas, and technology expertise created a culture in which sharing was a norm within the third-grade team.

The teachers viewed this culture of sharing as "like a comfort" and beneficial to their instruction and supportive to the group's planning. Shared responsibility for student learning, a shared repertoire of resources and being mutually engaged in a common purpose created continuous dynamic interactions and discussions among third-grade teachers. Throughout the planning sessions, the teachers continually negotiated meaning regarding the implementation of the project. This on-going and long-term collaboration occurred neither naturally nor easily. The teachers needed to spend time together before they were comfortable enough to share differences in teaching styles and to question each other's instructional choices. Using the decision-making strategy majority rule sustained the teachers' commitment to collaboration. Crosstalk, when a conversation continued across multiple turns and when the conversation involved multiple speakers, was another strategy that sustained the team members' commitment to collaboration. During project planning, teachers also engaged in pair planning. Pair planning stemmed from teachers' content proximity as well as physical proximity. Pair planning enabled the teachers to "be on the same page." Additionally, there were moments the teachers preferred to engage in individual planning, wherein they could individually think through and figure out the activities on their own and to flesh out lessons more fully. Overall, the teacher collaboration was vibrant and had layers of interactions during different times of planning process.

What understanding of digital literacy is implied in how the teachers integrate in their planning sessions?

This study revealed teachers demonstrated the shift in understanding of what it means to be literate in the 21st century. The third-grade team's insights about digital literacy encompassed developing 21st century skills, changing the definition of what is means to be literate, becoming a digital citizenship, creating relevance to students' lives, using technology for pleasure as well as

teaching, and creating additional monitoring of student use. The teachers indicated that they valued and highlighted the importance of using a variety of digital tools for instructional purposes to support students' participation in 21st century society. While not all the teachers specifically identified the 21st century skills, all five emphasized the importance of 21st century skills in engagement in a participatory society. Four out of five of the teachers talked about one or more aspects of the digital literacy definition used in this study. The teachers' interpretations of digital literacy mirrored their instruction. In addition to the teachers' definitions being mirrored in their instruction, the teachers recognized that their definitions of digital literacy have evolved as they gained new information about features of digital literacy. As a result of this evolution, the teachers continued to negotiate meaning around the reconceptualization of literacy as a collaborative process and to consider what this reconceptualization looks like and sounds like for their third-grade students.

5 DISCUSSION

In the present study, I sought to better understand the multifaceted situation of teacher's understanding of technology integration as revealed during their planning sessions while designing their PBL unit. I also explored the act of collaboration to expand current understandings of the learning opportunities afforded to teachers as they engaged in collaborative tasks. My purpose was to better understand how the teachers planned to integrate technology into their PBL projects. To address this purpose, I designed my study around the following three research questions:

1. How can elementary teachers planning be described?
2. How do elementary teachers interact in their planning sessions?
3. What understanding of digital literacy is implied in how the teachers integrate in their planning sessions?

Given that I framed this single case study through a sociocultural lens, I employed qualitative methods to guide my interviews, participant observations, and researcher reflections. Drawing upon research on effective professional development, teacher communities, and teacher collaboration, this single case Communities of Practice (CoP) perspective. Generally, data analysis included two-cycles in order to best address the research questions. Facilitated by DeDoose analysis software, I analyzed field-notes, interviews, and my reflections using constant comparative methods including applying the analyses processes of open coding and axial coding (Strauss & Corbin, 1998; Saldana, 2016). Data were continually analyzed, moving back and forth across data sources to identify themes. This chapter includes a discussion of the findings, teaching implications, research implications, and limitations of the study that I garnered from this analysis.

Interpretations of the Findings

Three theories framed my view of this third-grade teams' collaborative planning. A sociocultural framework and the view of literacy as practice enabled me to focus on the teachers' interactions, the school context and their daily routines and planning practices. A frame of a Community of Practice helped me to pay close attention to the third-grade teachers' interactions in the process of collective learning in a shared purpose and resources. Using these three theories helped me to uncover themes and associated major findings of the study. I include my interpretations of this study's findings below in detail.

The third-grade team displayed characteristics of a Community of Practice (CoP). I conceptualized the third-grade teachers as a Community of Practice (CoP) (Lave & Wenger, 1991). Viewing this group of teachers as a CoP, I examined their interactions during their planning sessions. This study illuminated how the collaborative discussions offered the teachers opportunities to learn from each other about different aspects of the instructional core, or what McLaughlin and Talbert (2001) refer to as the "essence of the schooling enterprise" (p. 18). Therefore, for these teachers, collaborative planning provided a rich learning experience. That learning stemmed from a culture in which sharing was a norm that encompassed being mutually engaged; having a common purpose; and sharing a repertoire of techniques, resources, ideas, and technology expertise. Sharing as a norm within this group was supported by the school administration and the school community such as the parents and partner institutions. Via a process described by Lave and Wenger (1991) as legitimate peripheral participation, the teachers gained access to knowledge and resources by working side-by-side with colleagues who at times served as more knowledgeable others (Wenger, 1998). Specifically, for these teachers: learning occurred during continuous professional development on PBL tenets and with the teachers'

discussions during their planning sessions when they clarified how to integrate technology in their project. Thus, for these teachers this culture of sharing offered the most accessible learning opportunities. The students of the teachers on this third-grade team benefited from the side-by-side learning that occurred such as increased teacher knowledge and teaching resources. Contributing to this third-grade team's CoP was the teachers shared responsibility for student learning. They shared responsibility in completing the project, and in covering the state's learning goals. This shared responsibility formed a cohesive bond among the teachers.

A CoP according to Lave and Wenger (1991) is not conflict free and neither was the one that existed within this team of teachers. Teacher positioning within this team added nuance to the notion of a CoP. The differences in the teachers' experience with the PBL framework and differences in their views on the importance of technology integration influenced the positioning I observed during the group planning discussions. The teachers' interactions did not need to be conflict-free in order to create meaningful collaboration. The third-grade teachers did not agree with every decision (Grossman et al., 2001) nor did they suppress their disagreement (Achinstein, 2002). As Grossman et al (2001) and Achinstein (2002) detailed in their studies, one of the challenges of a CoP groups is the need to negotiate tensions that exist in teacher communities geared to learning new practices, to deepening teachers' subject matter knowledge, and to defining community borders in order to accomplish the ultimate goal of organizational learning and change. Tensions appeared in how to start the PBL activities, the sequence of the activities, types of instruction, and if teacher guided or peer collaboration should be used during the project implementation. Similar to the teachers in Grossman et al's (2001) study, the third-grade teachers in this study were willing to agree to disagree or use the strategy of majority rule when disagreements arose in choosing activities for their classrooms. Generally, however, they

agreed on the big ideas of what and how to teach. This dynamic of disagreement among members within the group is not necessarily an indication of a dysfunctional teacher community, but rather an outcome of their work together and their weekly planning meetings that led to the creation of a culture of sharing. Weekly meetings facilitated continuous collaboration during the entire semester. Their collaboration, therefore, was on-going and long-term. The on-going and long-term collaboration sustained the teachers' commitment to collaboration and enabled the group to create strategies to solve conflict such as agreeing to disagree and the majority rule.

The teachers in this third- grade team were supported in their efforts to collaborate by school administration.. Teacher CoPs are groups with a common interest in learning collaboratively through social interaction and through sharing knowledge about the best practices related to their profession (Lave & Wenger, 1991). Borrowing from Lave and Wenger (1991), I conceptualize communities of practice (CoP) as vehicles that promote learning and collaboration within organizations. Prior research suggests that teachers cannot simply be told to collaborate; they need support (Supovitz, 2002) Supovitz (2002) asserts that teachers need, "organizational structures, cultures of instructional exploration, and ongoing professional learning opportunities to support sustained inquiries in improving teaching and learning" (p.1591). The teachers at Parker Academy were supported in each of these ways; organizational structures, cultures of instructional exploration, and ongoing professional learning; in their efforts to collaborate Typically, administrators take over or interfere with the teachers' planning and their decisions. On the contrary, in this study, the administrators primarily supported the teachers by providing allotted time for planning, resources and opportunities for teacher learning. The teachers at Parker Academy were supported in each of these ways; organizational structures, cultures of instructional exploration, and ongoing professional learning; in their efforts to collaborate. The

context in which the teachers in this study worked fostered collaboration while also created a check-balance system within the school structure. For example, the teachers had the flexibility to engage in multiple expressions of planning- collaborative, pair, and individual planning. A culture of instructional exploration was brought on by the entire school's adoption of a PBL instructional approach. Adopting a PBL approach influenced how the teachers interacted in significant ways. PBL framework enabled teachers to work closely, share their ideas and rediscover or discover the joy of collaborative learning while fostering deep teacher learning. Additionally, weekly grade level meetings and monthly schoolwide teacher meetings created check balance system among teachers and hold accountable for their project planning and implementations.

Finally, teachers' efforts to collaborate were supported by ongoing professional development. That professional development included longitudinal support from partner institution, (i.e., the Buck Institute), schoolwide teacher support groups, and grade level weekly teacher meetings. This multilayered support system fostered deep learning, the implementation of PBL projects and collaborative planning. Hence, for these teachers, support for their collaboration was essential. The accrued benefits of collaborative planning experienced by the teachers in this study finds support in other research. Researchers and practitioners agree that collaborative learning communities hold promise for developing a school's capacity evolve with changing contexts and needs (DuFour, 2007; Little, 2012). To illustrate, Louis and Marks (1998) examined the impact of teacher communities on student learning across 24 nationally selected schools. Their findings underlined that teacher communities contributed to enriched teaching practices and collaborative planning culture. This study captured the important role that the

alignment of goals among the school leadership and the third-grade community played in supporting the team's productive collaboration.

The teachers' collaborative planning, school support, and student demographics appeared to influence the ways the teachers integrated technology in their classrooms. This study illuminated that the teachers' collaborative participation within their planning community supported their integration of technology within their instruction and their interest in using technology in ways that prepared their students for the 21st century (Leu et al., 2013). To illustrate, the third-grade teachers shared their website resources during their planning meetings. The third-grade team's use of technology was also influenced by the support they were provided. In other words, the uniqueness of this school environment also impacted technology integration. This school had rich learning resources for both teachers and students, as well as established infrastructures, such as (stable internet connection). In addition, the school's working structures had a positive impact in implementing this new framework.

Finally, the teachers knew that for the students whom they served that as important as it is for all teachers to assist their students in the acquisition of the skills and knowledge required, for their students' success in the 21st century, their assistance is essential (Hutchison & Reinking, 2011). The teachers in this study revealed the importance for them to include 21st century skills and knowledge in their instruction. Comments such as having one to one technology is beneficial for the students' 21st century skills made during their planning sessions and interviews revealed their awareness of their role as teachers as well as the students' needs.

However, for teachers to offer such assistance, teachers need to know what constitutes 21st century literacies, and they need to know how to integrate digital technologies into their instruction. Unfortunately, many teachers who teach in low SES schools do not possess the

pedagogical and technological knowledge required to integrate technology into their classroom instruction (Hutchison &Reinking, 2011; Mishra & Koehler, 2006). By examining teachers' definition of "digital literacy," and using Leander's (2009) framework, I was able to capture the teachers' understanding of what it means for their students to be literate in the 21st century. In their definitions, the teachers discussed that they made this conceptual shift in what constitutes being literate by integrating technology within their instruction particularly as necessitated by creating a classroom climate of inquiry-based thinking and project-based learning encouraged by a PBL approach. Furthermore, the teachers' reconceptualization of literacy led to their teaching of critical 21st century skills that developed their students' digital citizenship and enabled them to create learning experinces relevant to their students. Also of importance, these teachers' reconceptualization of literacy mirrored which literacies, i.e., print or digital, they prioritized during their planning sessions. Leander's (2009) stances framework was also useful in gaging the teachers' reconceptualization of literacy. His framework, was also useful in gaging the teachers' reconceptualization of literacy. His framework, grounded in a new literacies perspective, examines teachers' stances (Leander, 2009) toward technology integration. grounded in a new literacies perspective, examines teachers' stances (Leander, 2009) toward technology integration. He describes four common stances teachers' exhibit in the relationship of print literacies with new literacies. Based on my examination of the comments the teachers made during the planning sessions coupled with their responses to my request for them to define digital literacy, individual teachers on this third-grade team exhibited specific orientations toward the relationship between print and new literacies. In addition, further analysis suggested that while a teacher might adopt one primary stance throughout most of the planning, each teacher might adopt another stance at different points across the planning sessions.

Suggestions for Practice

This study's findings suggest several instructional implications.

School administrators should create time and space for teachers to engage in collaborative thinking and planning. This study explored the nature of collaborative planning sessions and offers findings that can be draw upon when teachers plan instructions. Effective teacher learning includes opportunities for teachers to talk and engage in collaborative sharing of their existing practices, their efforts to explore new teaching possibilities, and their efforts to try out new ways of teaching (DuFour, 2007; Little, 2012). The administrators at Parker Academy afforded their teachers such opportunities. This support was crucial. These findings suggest that school administrators should create time and space for teacher collaborative thinking and planning. This is a change from current school organizations. And according to researchers (Senge, 2012) implementing such change requires time and the alignment of structures within schools. This study's findings support this research and demonstrate the reciprocal influences among a school's different layers of interactions needed to support school change (Senge, 2012).

Teachers and school administrations should pay attention to how the focus on teaching curriculum standards and preparing students for district assessments interfere with efforts to implement technology. The third-grade team's discussions highlighted how pressure to cover the state curriculum standards and to prepare students for district assessments affected the implementation of technology in their classrooms. Implementing technology is an important priority for schools serving vulnerable populations, thus attention must be given to how narrowing the focus to meet assessment proficiency levels influence teachers' efforts to implement technology. I am aware of the necessity to teach, monitor, and assess students especially like the students at Parker Academy and that easy or quick answers to solve those

challenges do not exist. However, it is essential to focus beyond covering standards and basic skills to preparing our students for their future success in their professional world and life.

Effective technology integration can be maintained through administrative support and interconnected structures. This study reveals that administrative support, school level structures, as well as district-level professional development were critical to the teachers' efforts to integrate technology within their instruction. As evidenced by this study, effective technology implementation is maintained through an interconnected, multi-layered, and meaningful learning plan that is grounded in a school's philosophy. Connecting teacher learning to school provides contextually connected and meaningful opportunities for technology integration and collaborative work through administrative support.

Teachers and school administrators should take advantage of the available support offered by professional organizations. Parker Academy teachers and administrators accessed resources offered by professional organizations. For example, they followed guidelines suggested by the International Society for Technology in Education (ISTE) and created a budget and collaborated with educational institutes to provide professional development. Professional organizations offer access to evidence-based research on technology integration and information related to the reconceptualization of literacy and thus serve as valuable resources for supporting teachers' understanding of technology integration. In addition, school administrators should pay membership fees to enable their faculty to access professional organizations' interactive portals. For instance, Parker Academy received professional support and collaborated with The International Society for Technology in Education (ISTE) as part of the ICS grant. Access to professional organizations fosters member participation through their interactive platforms. In addition, these organizations provide connections with others through their social media accounts

such as Twitter, Facebook and blogs. These online portals encourage active participation and connect educators with reliable sources for learning.

Schools should consider implementing inquiry-based, collaborative practices to enhance teacher learning. I offer this implication to teachers as well as to teacher educators. Teacher educators need to include in their coursework content to enhance teachers and teacher candidates' ability to critique the quality of online resources and their mastery experiences. Content accessed from the Internet and online platforms should be critiqued for quality and accuracy. Having this ability will help teachers to make informed decisions about such resources. In addition, teachers like their students, benefit from hands-on learning (Dillon, O'Brien, Sato & Kelly, 2011). Research supports creating a school culture that encourages teacher inquiry. For example, according to Dillon, O'Brien, Sato and Kelly (2011), teacher learning should be embedded in practice and should offer opportunities for trial and error when learning new instructional strategies and techniques. Teacher educators could support teachers and teacher candidates by exposing their students to inquiry-based practices, such as critical thinking, problem-solving skills, and collaborative learning during their graduate and undergraduate program. The teachers in this study were supported by their participation in weekly collaborative planning sessions. Collaborative engagement offered the teachers the opportunity to ask their colleagues questions and to examine their teaching practices through an inquiry lens (Sato, Wei, Darling-Hammond, 2008). Like the administrators at Parker Academy, school administrators should find ways to provide professional learning opportunities to support collaboration and a culture of inquiry.

School administrators should support teachers' efforts to acquire understandings of literacy in the 21st century. The teachers' reconceptualization of literacy and interpretation of

digital literacy were grounded in their communications with each other and their desire to create opportunities to support their students' development as digital citizens. The school administrators at Parker Academy provided opportunities for their teachers to broaden their definitions of literacy to include the role of multimodality, the critical evaluation of texts, the importance of being producers rather than just consumers of text, and the participatory nature of digital literacy. To encourage teachers to explore broader definitions of literacy, administrators should provide opportunities for their teachers to engage in discussions and inquiry around this reconceptualization of literacy and its application in the classroom instruction. Such discussions would create opportunities for teachers to examine traditional and contemporary understandings of literacy and how they are distinguished in their instruction

Suggestions for Research

The findings of this study suggest the following research implications.

Additional research should be conducted with a wide variety of teachers from diverse school settings to further develop an understanding of the complex processes teachers use while planning. In this study, some of the teachers were involved in a school wide PBL professional development project prior to my study. That PD encouraged teacher collaborative planning. Given that most teachers do not receive PD that encourages collaborative planning, research might provide information useful to a broader teacher population.

Additional research should examine teachers who have limited access to technology resources and support. The teachers in my study were unusual in that they had access to a technology rich learning environment. In addition, before this study, the school had a long-term partnership with nearby research universities which provided the teachers professional development in technology integration. Thus, the teachers did not resist the requirement to

integrate technology within their instruction. Teachers without such technology resources and support, might exhibit more resistance toward technology integration when planning instruction and toward new conceptions of literacy wrought by digital literacies. In addition, they might have resisted digital literacies but still planned and provided instruction with integrating technology. Therefore, it is important to extend research on teacher planning to other populations of teachers.

Longitudinal research should examine CoP to understand better how elements of communities of practice, such as mutual engagement, joint enterprise, and shared repertoire of resources can support teacher learning. This study demonstrated that CoP holds promise for understanding teachers planning processes and technology integration. However, this was a short-term study. Further long-term examinations of CoP may yield deeper understanding of how a CoP can be implemented to enhance teacher learning.

Limitations

Each study comes with limitations. I identify five for this study. One, this study took place in one school. A single school cannot represent all elementary schools. For that reason, the conclusions drawn from this unique group cannot be generalized to other elementary teachers or teachers at other grade levels. However, this study provided opportunities for an in-depth investigation of the teachers' understanding of digital integration as they participated in collaborative planning sessions. Much can be learned from a detailed examination of a particular case. The thick descriptions and the in-depth analysis may provide useful information for others who want to understand how teachers collaboratively plan to integrate digital technologies. Two, teachers in the third, fourth, and fifth grades participated in planning sessions with their grade-level colleagues. I made the decision to focus on the third-grade team, because focusing on one

grade level helped me to examine their interpretation of technology integration and their collaborative planning in more depth. Three, I only observed the teachers' planning sessions and the students' presentations of their final projects. There may have been other times the teachers engaged in planning activities that are not accounted for in this study and thus their examination may have provided additional insights into how the teachers collaboratively planned to integrate technology. Even though I focused only on the teachers' planning sessions, I was able to gain an in-depth understanding of how teachers' thought through and conceptualized technology integration. Four, the teachers in this study served students from a low SES urban area, yet both teachers and students had a resource-rich learning environment. This is not the typical situation for most teachers who teach in these areas. Although this school is unique, the data presented provides information that others who teach in more typical school settings may find useful when exploring how to support teachers' technology integration. Five, this study demonstrated that the idea of a Community of Practice (CoP) holds promise for understanding teachers' planning processes and technology integration. However, it did not examine closely elements of CoP's, such as mutual engagement, joint enterprise, and shared repertoire of teaching resources which would have provided deeper insight into how these elements interact collectively or separately to support teacher learning. Although, this study did not offer a detailed examination of individual elments of CoP, it does provide a holistic look at how this group of teachers engaged in planning as a CoP.

Conclusion

In this study, I sought to gain insight into the complex situation of teachers' understanding of technology integration as revealed during their collaborative professional development planning sessions while designing their PBL project. Of significance, the

participants in this study, work in a school in an urban low SES area but they have the support of their administration and access to a technology-rich learning environment. Therefore, situating the study in this school offered a unique context to study how teachers when provided administrative support and the technology planned to use that technology in their instruction. Furthermore, this study examined the teachers' interactions and found that opportunities to collaboratively plan contributed to the teachers' learning. Thus, I hope my examination of the five teachers' collaborative interactions as they planned to use digital technology offers insights into how to assist other teachers in those efforts.

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Appendix

Teacher Interview Questions

1. Could you describe and reflect on the planning process of this project?

2. What is your definition and understanding of “Digital Literacy integration”?

3. Could you reflect on the idea of “collaborative planning”? Was it different than your previous planning experiences? If so, how?

4. Did you have any goals at the beginning of the project? If you had, were you able to achieve those goals?

5. If you could not achieve your goals, what could be the reasons?